PORT OF
NEW ORLEANS

JULIA STREET CRUISE TERMINAL
TERMINAL IMPROVEMENTS

Requisition No. 055473
State Project No. 578-36-0017(323)
W.O. # 1-938
FUNDED IN PART
BY
LOUISIANA TRANSPORTATION TRUST FUND THROUGH THE PORT
CONSTRUCTION AND DEVELOPMENT PRIORITY PROGRAM

TYPE OF CONSTRUCTION: (1) BUILDING CONSTRUCTION

Volume II: Section 08111 to Minority and Women Business Enterprises

December 17, 2010

Prepared by

Mathes Brierre Architects
A Professional Architectural Corporation
201 St. Charles Avenue
Forty-First Floor
New Orleans, Louisiana 70170-4100

1350 Port of New Orleans Place
P.O. Box 60046
New Orleans, LA 70160
Phone: 504-528-3296 Fax: 504-528-3278

BOARD OF COMMISSIONERS
OF THE
PORT OF NEW ORLEANS

JULIA STREET CRUISE TERMINAL
TERMINAL IMPROVEMENTS

Requisition No. 055473

Work Order No. 1-938

Contact the Louisiana One-Call Hotline 48 Hours before digging @ 1-800-272-3020

Contract Documents
Prepared by

Mathes Brierre Architects.
A Professional Architectural Corporation
201 St. Charles Avenue
Forty-First Floor
New Orleans, Louisiana 70170-4100
Voice 504.586.9303 Fax 504.582.1305

December 17, 2010

New Orleans, Louisiana

TABLE OF CONTENTS
FOR
JULIA STREET CRUISE TERMINAL
TERMINAL IMPROVEMENTS
SPN 578-36-0017 (323)

CONSTRUCTION PROPOSAL CP1

TABLE OF CONTENTS ..... TC 1-5

CORPORATE RESOLUTION ..... CR 1

NOTICE TO CONTRACTORS ..... NC 1-3

INSTRUCTION TO BIDDERS ..... IB 1-6

BID FORM ..... BF 1-2

GENERAL PROVISIONS 1-53

1. Definitions and Terms
2. Proposal Preparation & Bidding Requirements
3. Award of Contract
4. Contract Documents
5. Control of Work
6. Control of Materials
7. Legal Relations and Responsibility to the Public
8. Prosecution and Progress
9. Warranty and Guarantee
10. Measurement and Payment

SPECIAL PROVISIONS

1. General Bidding Requirements ..... SP 1
2. Additional Insurance Requirements for Contractors ..... SP 2-4

3. Indemnity ..... SP 4

4. Minority and Women Business Enterprises ..... SP 5

5. Taxes ..... SP 6- 8

6. Public Works Priority Programs ..... SP 9

7. Inspection of Utilities ..... SP 10

8. Contract Time ..... SP 11

SUPPLEMENTAL SPECIFICATIONS

1. Supplemental Specifications ..... SS 1

2. General Requirements ..... SS 2-4

3. Temporary Facilities, Utilities and Operations ..... SS 5-9

4. Environment Protection ..... SS 10-13

5. Submittals ..... SS 14-23

6. Work on or Adjacent Railroad ..... SS 24

TECHNICAL SPECIFICATIONS

1. Environment Protection……TS02000
2. Selective Demolition and Removal of Existing Structure……TS02060
3. Earthwork ……TS02222
4. Soil Treatment for Termite Control……TS02281
5. Steel Pipe Piles……..TS02364
6. Composite and Treated Timber Piles……..TS02365
7. Chain Link Fences and Gates……....TS02830
8. Formwork for Concrete……..TS03100
9. Reinforcing Steel……TS03200
10. Structural Site Cast Concrete……TS03300
11. Concrete Floors – Sealed……..TS03350
12. Masonry System……TS04300
13. Cast Stone……..TS04720
14. Structural Steel……..TS05100
15. Steel Joists……TS05210
16. Steel Decking……TS05300
17. Cold Formed Metal Framing……....TS05400

18. Miscellaneous Metal ……..TS05500
19. Railings and Handrails……TS05522
20. Treated Timbers And Lumber……..TS06110
21. Architectural Woodwork……..TS06410
22. Liquid Applied Vapor/Air Barrier Membrane……..TS07130
23. Crystalline Waterproofing……..TS07145
24. Building Insulation……..TS07210
25. Spray On Fireproofing……...TS07255
26. Firestopping .....……...TS07270
27. Interior Metal Wall Panels……..TS07400
28. Modified Bitumen Roofing and Sheet Metal……TS07514
29. Sheet Metal Roofing……TS07610
30. Joint Sealers……..TS07901
31. Standard Steel Doors and Frames……TS08111
32. Wood Doors……TS08200
33. Access Doors……TS08305
34. Roll-Up Doors……..TS08331
35. Interior Aluminum Entrances and Storefront……..TS08410
36. Door Hardware……TS08710
37. Glazing……TS08800
38. Glazed Aluminum Curtainwall……..TS08900
39. Portland Cement Plaster……TS09220
40. Gypsum Board Systems……...TS09260
41. Tile Work……TS09300
42. Suspended Acoustical Ceilings……TS09511
43. Suspended Metal Ceilings……...TS09540
44. Resilient Tile Flooring and Base……TS09660
45. Resilient Sheet Flooring and Integral Base……TS09665
46. Resinous Flooring……..TS09670
47. Underlayment for Resinous Flooring……..TS09672
48. Carpet……..TS09688
49. Water Vapor Emission Control Systems……..TS09690
50. Elastomeric Coating……..TS09800
51. Painting……TS09900
52. Wallcovering……...TS09955
53. Metal Toilet Partitions……TS10160
54. Wall and Corner Guards……...TS10260
55. Signage……...TS10440
56. Fire Extinguishers, Cabinets and Accessories……..TS10522
57. Toilet Accessories……..TS10800
58. Hydraulic Elevators……TS14245
59. Escalators……..TS14310
60. Basic Materials and Methods……TS15050
61. Piping and Equipment Insulation……..TS15250
62. Plumbing……TS15400
63. Fire Suppression System……TS15500

64. Clean-Agent Fire Suppression System……..TS15550
65. Heating, Ventilation and Air Conditioning……..……TS15800
66. Testing and Balancing of Air and Hydronic Systems……TS15850
67. Valves, Strainers, Unions and Fittings……..……..TS15900
68. Building Automation System……..TS15950
69. Electrical General……..…TS16010
70. Electrical Materials and Methods……...TS16050
71. Electrical Services……..……TS16400
72. Lighting Fixtures……..……...TS16500
73. Public Address and Music System……..……TS16600
74. Fire Detection and Alarm System……..……..TS16760
75. Telecommunications Distribution Systems……..……..TS16840
76. Electrical Equipment Connections……..……TS16900

CONTRACT ..... C 1-2

PAYMENT BOND ..... PB 1-2

PERFORMANCE BOND ..... PRB 1-2

BIDDERS AFFIDAVIT ..... BA 1

ATTESTATION CLAUSE……AC-1

REQUEST TO SUBLET ..... RS 1

CERTIFICATE OF LIABILITY INSURANCE ..... CLI 1-2

MINORITY AND WOMEN BUSINESS ENTERPRISES ..... MW 1

APPENDIX #1 – APPROVED MANUFACTURERS ..... APP 1

DRAWINGS BOUND SEPARATELY

DRAWINGS NOS.

Architectural: BH-12100-A1, BH-12100-LS1 through LS4, BH-12100-S1, BH-12100-A2 thru A71

Structural: BH-12100-SO.1, S1.1, S1.2, S1.3, S1.4, S1.5, S1.6, S1.7, S2.1, S2.2, S2.3, S3.1, S3.2, S3.3, S4.1 and S4.2

Mechanical: BH-12100-M1.1, M1.2, M2.1, M2.2, M2.3, M3.1, M3.2, M3.3, M3.4, M4.1, M4.2, M5.1, M5.2 and M5.3

Fire Protection: FP1.1, FP1.2 and FP1.3.

Electrical: BH-12100-E1.1, E1.2, E2.1, E2.2, E2.3, E3.1, E3.2, E4.1, E4.2, E5.1, E5.2, E5.3, E5.4 and E5.5.

SECTION 08111 - STANDARD STEEL DOORS AND FRAMES

PART 1 - GENERAL

1. SCOPE

A. The work covered by this section consists of furnishing all plant, equipment, labor, miscellaneous materials, and performing all operations in connection with the fabrication and installation of new standard steel doors and steel frames in accordance with these specifications and Contract Drawings. Refer to "SECTION 08710 - Finish Hardware" for hardware requirements for doors specified herein.

2. SUBMITTALS

A. Submit product data for each type of door and frame specified, including details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profiles, and finishes.

B. Submit Shop Drawings showing fabrication and installation of standard steel doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation equirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.

C. Provide schedule of doors and frames using same reference numbers for details and openings as those on Contract Drawings.

3. QUALITY CONTROL

A. General: Provide doors and frames complying with Steel Door Institute "Recommended Specifications Standard Steel Doors and Frames" ANSI/SDI-100 and as herein specified.

B. Delivery, Storage and Handling: Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage.

C. Inspect doors and frames upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to Engineer; otherwise, remove and replace damaged items as directed.

D. Store doors and frames at project site under cover. Place units on minimum 4-inches high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 1/4-inches spaces between stacked doors to promote air circulation.

4. DESIGN AND MANUFACTURE REQUIREMENTS

A. Manufacturer: Subject to compliance with requirements, provide standard steel doors and frames by one of the following:

1. Amertex

2. Ceco Corp.

3. Fenestra Corp.

4. Kewanee Corp.

5. Republic Builders Products

6. Steelcraft Manufacturing Co.

7. MPI Group

8. Security Metal Products Corp

PART 2 - MATERIALS

5. MATERIALS

A. Hot-Rolled Steel Sheets and Strip: Commercial quality carbon steel, pickled and oiled, complying with ASTM A 569 SNF ASTM A 568.

B. Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A 366 and ASTM A 568.

C. Galvanized Steel Sheets: Zinc-coated carbon steel sheets of commercial quality, complying with ASTM A 526, or drawing quality, ASTM A 642, hot dipped galvanized in accordance with ASTM A 525, with A60 or G60 coating mill phosphatized.

D. Supports and Anchors: Fabricate of not less than 18-gage sheet steel; galvanized where used with galvanized frames.

E. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where items are to be built into exterior walls, hot-dip galvanize in compliance with ASTM A 153, Class C or D as applicable.

F. Shop Applied Paint: Apply after fabrication.

6. DOORS

A. Provide metal doors of SDI grades and models specified below or as indicated on Contract Drawings and schedule herein:

1. Interior Doors: ANSI/SDI-100, Grade-, heavy-duty, seamless, minimum 18-gage cold-rolled sheet steel faces.

2. Exterior Doors: ANSI/SDI-100, Grade-, extra heavy-duty, seamless, minimum 16-gage galvanized steel faces.

7. FRAMES

A. Provide metal frames for doors, of types and styles as shown on drawings and schedules. Conceal fastenings, unless otherwise indicated. Fabricate frames of minimum 16-gage cold-rolled steel at interior and 14 gauge galvanized steel at exterior and of fully welded one piece units. Knock-down frames are not permitted

B. Door Silencers: Except on weather stripped frames, drill stops to receive 3 silencers on strike jambs of single-door frames and 2 silencers on heads of double-door frames.

8. FABRICATION

A. Fabricate steel door and frame units to be rigid, neat in appearance and free from defects, warp or buckle. Wherever practicable, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory-assembled before shipment, to assure proper assembly at project site. Comply with ANSI/SDI-100 requirements.

B. Internal Construction: Manufacturer's standard honeycomb, core, resin impregnated, nominal one-inch size cell kraft fiber, with minimum of 42 psi crushing strength laminated to face sheets where at interior units and steel stiffened or solid foam at exterior units in accordance with SDI standards

C. Clearances: Not more than 1/8 inch at jambs and heads except between non-fire-rated pairs of doors not more than 1/4 inch. Not more than 3/4 inch at bottom.

D. Fabricate exposed faces of doors and panels, including stiles and rails of non-flush units, from only cold-rolled steel.

E. Tolerances: Comply with SDI 117 "Manufacturing Tolerances Standard Steel Doors and Frames".

F. Fabricate frames, concealed stiffeners, reinforcement, edge channels, louvers and moldings from either cold-rolled or hot-rolled steel.

G. Fabricate exterior doors, panels, and frames from galvanized sheet steel in accordance with SDI-112. Close top and bottom edges of exterior doors as integral part of door construction or by addition of minimum 16-gage inverted steel channels.

H. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.

I. Hardware Preparation: Prepare doors and frames to receive mortised and concealed hardware in accordance with final Door Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A115 Series Specifications for door and frame preparation for hardware. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at project site.

J. Locate hardware as indicated on final shop drawings or, if not indicated, in accordance with "Recommended Locations for Builder's Hardware on Standard Steel Doors and Frames", published by Door and Hardware Institute.

K. Shop Painting: Clean, treat and paint exposed surfaces of steel door and frame units, including galvanized surfaces.

1. Clean steel surfaces of mill scale, rust, oil, grease, dirt and other foreign materials before application of paint.

2. Apply shop coat of prime paint of even consistency to provide a uniformly finished surface ready to receive finish paint.

PART 3 - EXECUTION

9. INSTALLATION

A. Install standard steel doors, frames, and accessories in accordance with final shop drawings, manufacturer's data, and as herein specified.

B. Placing Frames: Comply with provisions of SDI-105 "Recommended Erection Instructions for Steel Frames", unless otherwise indicated.

1. In masonry or concrete construction, locate 3 wall anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Acceptable anchors include masonry wire anchors and masonry Tee anchors.

C. Door Installation: Fit hollow metal doors accurately in frames, within clearances specified in ANSI/SDI-100.

D. Adjust and Clean: Prime Coat Touch-up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.

E. Final Adjustments: Check and readjust operating hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

END OF SECTION

SECTION 08200 - WOOD DOORS

PART 1 - GENERAL

1. SECTION INCLUDES

A. Interior flush solid core wood doors for transparent finish.

B. Factory finishing of all doors and frames.

C. Factory prefit and premachine doors.

D. Fire Rated assemblies.

2. RELATED SECTIONS

A. Section 08112 - Steel Frames

B. Section 08710 - Door Hardware

3. REFERENCES

A. AWI - Quality Standards of the Architectural Woodwork Institute.

B. ASTM E152 - Methods of Fire Tests of Door Assemblies.

C. NFPA 80 - Fire Doors and Windows.

D. NFPA 252 - Standard Method of Fire Tests for Door Assemblies.

E. UL 10B - Fire Tests of Door Assemblies.

4. SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Illustrate door opening criteria, sizes, types, swings, special blocking for hardware, identify cutouts for glazing.

C. Product Data: Indicate door core materials and construction; veneer species, type and characteristics and factory finishing criteria.

D. Manufacturer's installation Instructions: Indicate special installation instructions, if any.

E. Samples: Wood veneers illustrating wood grain, stain color and sheen.

5. QUALITY ASSURANCE

A. Perform work in accordance with AWI Quality Standard, Section 1300.

6. DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products.

B. Package, deliver and store doors in accordance with AWI Standard.

7. FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

8. COORDINATION

A. Coordinate the work with door opening construction, door frame and door hardware installation.

9. REGULATORY REQUIREMENTS

A. Fire Rated Construction: Conform to ASTM E152, NFPA 252 or UL 10B.

B. Installed Assembly: Conform to NFPA 80 for fire rated class as scheduled.

10. WARRANTY

A. Door Manufacturer's Warranty: Submit written agreement on door manufacturer's standard form signed by manufacturer, Installer, and Contractor, agreeing to repair or replace defective doors that have warped (bow, cup, or twist) more than 1/4 inch (6.35 mm) in a 42 by 84 inch (1067 by 2134 mm) section or that show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3 inch (0.25 mm in a 75 mm) span, or do not conform to tolerance limitations of referenced quality standards.

1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors where defect was not apparent prior to hanging.

2. Warranty shall be in effect during the following period of time after date of Substantial Completion: Life of Installation.'

PART 2 - PRODUCTS

11. MANUFACTURERS

A. Algoma Hardwoods, Inc.

B. Buell Doors

C. Eggers Hardwood Products, Inc.

D. IPIK Door Company

E. Marshfield (Weyerhauser Company, Inc.)

F. Southwood Door Co

12. FLUSH DOORS

A. Flush Interior Doors: $1^{3}/_{4}$ inches thick; solid core construction.

B. Construction (Non fire rated): AWI Section 1300, Type PC-5 with $1^{3}/_{8}$" vertical stiles and $1^{3}/_{4}$" top and bottom rails glued securely to core parts; no voids or finger joint material allowed.

1. Stile edge screw withdrawals when tested in accordance with ASTM D-1037-78 shall exceed 740 lbs. and VA 08210-TM shall exceed 700 lbs.

2. Bonding: Stiles and rails bonded to core, then entire unit abrasive planed before veneering.

C. Particle Board Core: Conform to ANSI standard A208.1-1989 Grade 1-LD-2 covering mat formed particle board with face screw holding of 125 pounds, modulus of rupture of 800 psi, modulus of elasticity of 150,000 psi, and density of 32 pounds per cubic foot.

D. Crossbands: Hardwood (no synthetics) crossbands and faces shall be laminated to the core with glue by the hot press process.

E. Veneer Facing (Transparent Finish): AWI Premium quality species wood, as follows for transparent finish with book matched or slip match veneers to prevent dark/light striping affect of adjacent flitches, minimum 1/32" thick before sanding at 12% moisture content.

1. Species White Maple, plain sliced.

2. Pairs and Sets: Provide pair matching and set matching for pairs of doors and for doors hung in adjacent sets.

F. Adhesive: Water resistance except Type I - waterproof at face veneers.

G. Fire Rated Door (45 min. and higher): Constructed as above except with inert mineral core, minimum 1/2" top rail, minimum $1^1/_4$" bottom rail and 5" reinforcement header at closers.

13. FABRICATION

A. Fabricate doors in accordance with AWI Quality Standards

B. Factory-prefit and premachine doors to fit frame opening sizes indicated with the following uniform clearances and bevels:

1. Comply with tolerance requirements of AWI for prefitting and as follows:

a. 1/8" on top, hinge and lock edges.

b. 1/8" at meeting edges on paired doors.

c. Bevel both edges 1/8" in 2".

2. Coordinate measurements of hardware mortises in frames to verify dimensions and alignment before proceeding with factory premachining. Comply with final hardware schedules and door frame shop drawings and with hardware templates.

C. Vertical exposed Edge of Stiles: Of same species as veneer facing for transparent finish.

D. Fit door edge trim to edge of stiles after applying veneer facing.

E. Bond edge banding to cores.

F. At double doors continue sequence of matching veneers across the face of both doors.

G. Provide additional solid blocking at stiles and rails for hardware reinforcement for hinges, closers and lockset/latchsets.

H. Fabricate fire rated doors in accordance with AWI Quality Standards and to UL requirements.

14. FACTORY FINISHING (TRANSPARENT FINISH)

A. Factory finish wood doors in accordance with AWI - Section 1500 System TR-4, Conversion Varnish, nonyellowing alkyd based, as follows to provide a satin-medium rubbed effect 10° -20°.

1. Sand (100 - 200 grit stearated paper)

2. Washcoat (conversion varnish reduced)

3. Sealer (conversion varnish reduced)

4. Sand (220 grit stearated paper)

5. Topcoat

6. Topcoat

B. Coordinate with wood finished specified in Section 06410 - Architectural Woodwork.

PART 3 - EXECUTION

15. EXAMINATION

A. Verify that opening sizes and tolerances are acceptable.

B. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

16. INSTALLATION

A. Install doors in accordance with AWI Quality Standard.

1. Comply with NFPA 80 at fire rated doors.

B. Trim door height by cutting bottom edges to a maximum of 3/4 inch.

C. Pilot drill screw and bolt holes.

D. Machine cut for hardware. Core for handsets and cylinders.

E. Coordinate installation of doors with installation of frames specified in Division 8 and hardware specified in Section 08710.

17. INSTALLATION TOLERANCES

A. Maximum Diagonal Distortion (Warp): 1/8 inch measured with straight edge or taut string, corner to corner, over an imaginary 36 x 84 inch surface area.

B. Maximum Vertical Distortion (Bow): 1/8" measured with straight edge or taut string, top to bottom, over an imaginary 36 x 84 inch surface area.

C. Maximum Width Distortion (Cup): 1/8 inch measured with straight edge or taut string, edge to edge, over an imaginary 36 x 84 inch surface area

18. ADJUSTING

A. Adjust work.

B. Adjust door for smooth and balanced door movement.

END OF SECTION

SECTION 08305 - ACCESS DOORS

PART 1 - GENERAL

1. SECTION INCLUDES

A. Steel access doors.

B. Provide fire rated doors when penetrating fire rated construction.

2. RELATED WORK

A. Painting of Access Doors: Section 09900, Painting

3. IRE RATING CLASSIFICATION

A. Fire rated access doors shall bear the Underwriters Laboratories, Inc., l-l/2 hour "B" Label (250 degrees rating).

4. SUBMITTALS

A. In accordance with Section 0l300.

B. Shop Drawings: Access doors, each type, showing construction, location and installation details.

C. Manufacturer's Literature and Data: Access doors, each type.

5. APPLICABLE PUBLICATIONS

A. The National Association of Architectural Metal Manufacturers (NAAMM): Metal Finishes Manual (August, l969)

PART 2 - PRODUCTS

6. FABRICATION, GENERAL

A. Fabricate components so as to be straight, square, flat and in same plane where required. Slightly round exposed edges and provide access without burrs, snags and sharp edges. Welds where exposed shall be continuous and ground smooth.

B. Number of locks and non-continuous hinges shall be as required to maintain alignment of panel with frame, except for fire rated doors, the number shall be the same as required by the fire test.

C. Provide anchors or make provisions in frame for anchoring to adjacent construction. Provide size, number and location of anchors as required to secure access door in opening and as required by fire test.

7. ACCESS DOORS, FIRE RATED

A. Door Panel: Form of 0.0359 inch thick galvanized steel sheet, insulated sandwich type construction.

B. Frame: Form of 0.0598 inch thick galvanized steel sheet of depth and configuration to suit material and type of construction where installed. Provide frame flange at perimeter where installed in concrete and masonry openings. Weld exposed joints in flange and grind smooth.

C. Automatic Closing Device: Provide automatic closing device for each door.

D. Hinge: Continuous steel hinge with stainless steel pin.

E. Lock: Self-latching, with provision for fitting flush a standard screw-in type lock cylinder. Lock cylinder is specified in Section 08710- Hardware. Provide latch release device operable from inside of door. Mortise lock case in door.

8. ACCESS DOORS, FLUSH PANE

A. Door Panel: Form of 0.0747 inch thick galvanized steel sheet. Reinforce as required to maintain flat surface.

B. Frame: Form of 0.0598 inch thick galvanized steel sheet of depth and configuration to suit material and type of construction where installed and to align flush with surrounding construction. Provide surface mounted units having frame flange at perimeter where installed in concrete or masonry construction. Weld exposed joints in flange and grind smooth.

1. At drywall construction provide perforated portion of frame with bead for joint treatment flush with face of gypsum board; overlapping flange is not permitted.

C. Hinge: Concealed spring hinge to allow panel to open l75 degrees. Provide removable hinge pin to allow removal of panel from frame.

D. Lock: Flush, screw driver operated cam lock.

9. FINISH

A. Steel Surfaces: Baked-on prime coat over a protective phosphate coating.

10. SIZE

A. Access doors shall be minimum 12 inches, unless otherwise shown.

PART 3 - EXECUTION

11. LOCATION

A. Provide access panels or doors wherever any valves, traps, air splitter dampers, cleanouts and other control items of mechanical, and electrical work are concealed in wall, partition or ceiling construction.

12. INSTALLATION, GENERAL

A. Install access doors in openings to have sides vertical in wall installations, and parallel to ceiling grid or side walls when installed in ceiling. Set frames so that edge of frames without flanges will finish flush with surrounding finish surfaces.

13. ANCHORAGE

A. Secure frames to adjacent construction using anchors attached to the frames or by use of bolts or screws through the frame members. Type,size and number of anchoring device shall be suitable for the material surrounding the opening, and as required to maintain alignment and resist displacement during normal use of the access door and the building.

1. Anchors for fire rated access doors shall be as required by the fire test.

14. ADJUSTMENT

A. Adjust hardware so that the door panel will open freely, and when closed the door panel will be centered within the frame.

END OF SECTION

SECTION 08331 - ROLL-UP DOORS

PART 1 - GENERAL

1. SCOPE

A. The work covered by this section consists of furnishing all plant, equipment, labor, miscellaneous materials, and performing all operations in connection with the fabrication and installation of new motor operated steel roll-up doors in accordance with these specifications and Contract Drawings.

2. SUBMITTALS

A. Equipment Descriptions: The Contractor shall submit complete descriptions of roll-up doors including, overall dimensions, motor type, serviceability requirements, etc. to the Engineer for approval prior to commencement of work.

B. Design Calculations: Door assembly shall be rated fro 130 mph winds in accordance with IBC 2006 and ASCE-07-02. The Contractor shall submit complete design calculations to assure that the doors will meet the minimum design requirements as described below. Calculations shall be stamped by a licensed professional Engineer in the State of Louisiana.

3. QUALITY CONTROL

A. General: The Contractor shall establish and maintain quality control for the installation of roll-up doors to assure compliance with contract specifications.

B. Warranty: All work and materials shall be guaranteed to remain in serviceable condition as herein above defined, completely free of defects in material and workmanship for a period of one (1) year from date of final acceptance.

4. DESIGN AND MANUFACTURE REQUIREMENTS

A. General: The door manufacturer shall have designed and manufactured similar doors giving creditable service for at least ten (10) years, such as McKeon Rolling Steel Door Co., Inc., Kinnear (a division of Wayne Dalton Corporation), and Overhead Door, Inc.

B. These specifications give the minimum requirements for an acceptable door, but all details are not listed. Responsibility to meet design requirements is to be assumed by the manufacturer. Leeway will be given to take advantage of each manufacturer's experience and shop facilities, provided other doors of this type, are of equal quality and strength.

C. Features covered by these specifications shall be adhered to in each door furnished, or similar details providing equivalent results must be provided to the satisfaction of the Engineer. Unless deviations from these specifications are definitely designated in submitting bids, by direct reference to such deviations, the detail specifications of the Board must be followed, or such changes shall be made in the details of the door furnished as will be satisfactory to the Engineer.

D. Type and Arrangement: Each door furnished shall be of the interlocking slat, rolling curtain type, non-automatic (i.e. without automatic closing device), and counterbalanced by coiled springs. The details of size and operation of each door shall be as designated in the Section and as shown on the Contract Drawings. All specified details apply to each door.

1. The curtain, guides, drum and operating mechanism shall be surface mounted on the inside face of the wall. Outside hoods are not needed for weather protection. Curtain guides shall be furnished for attachment to the structure throughout their height and shall include solid plates or shapes as required, all furnished by the Contractor except as specified otherwise. They shall clear the structural steel at the sides of the opening, and shall provide complete side closure when the door is down. The curtain shall rise to, or above, the bottom of the girt or other member serving as a soffit. The Contractor shall furnish curtain stops.

2. The mounting shall be consistent with structural details shown on the drawings, or as called for elsewhere in these specifications. If important details are not shown, missing information must be secured by the Contractor, or provision shall be made by him for adjustments in erection. If the mounting shown or specified is inadequate for the door bid on, as regards proper support of equipment or strains on the supporting structure, added details for satisfactory mounting shall be supplied by the Contractor. The bid shall be based on adequate mounting.

E. Requirements for Doors and Equipment: Requirements for motor operated steel rolling doors and auxiliary equipment are as follows:

<u>Design Conditions</u>

To meet wind pressure of each slat shall be provided at both ends with 25 lb./sq.ft. curtain hot dipped galvanized malleable iron or bronze and other conditionsarea endlocks or windlocks. Windlocks shall be placed on both ends of alternate slats.

Failure in some part of curtain or guides at a wind pressure at 50 lb./sq. ft.	
To operate freely with winds not exceeding a velocity of 25 mph and with one man pulling not more than 35 pounds on the emergency hand chain when there is no appreciable wind.	Design for motor operation with limits stops and emergency hand-chain as hereinafter specified.
Minimum Dimensions of Curtains, Guides, and Other Parts	
Minimum thickness of curtain slat	18 U. S. gauge
Width of slat between interlock centers	6 in. pitch
Slat	Flat
(Minor variations are permitted if slats are as strong and stiff as the No. K-9 slat of the Kinnear Mtg. Co. made of the above designated gauge.)	
Two bottom bars (short leg vertical) and bottom seal.	3½ in. x 2½ in. x ¼ in. Galvanized Angles
Curtain guides, minimum thickness	d in., plus windlock bars
Minimum depth of grooves	3-5/8 in.
Curtain drum, not less than	12 in. pipe @ 43.77 lb./ft.
Minimum drum shaft diameter	1¾ in.

F. Other important details and dimensions to be as stated in information submitted with he bid, including designating of details differing from those given herein, but equivalent in stiffness and strength.

PART 2 - PRODUCTS

5. MATERIALS

A. Curtain: Slats shall be made from pure iron or copper bearing steel. The strip shall be galvanized with a tight uniform coating of zinc by the hot-dip process. The quality and uniformity of coating shall be not less than ASTM Designation A 525, latest revision, Class 1.25 ounces (G 90).

1. In order to insure adhesion for immediate or future painting, the galvanized curtain slats shall be bonderized or shall receive equally effective surface preparation and pretreatment by the manufacturer following galvanizing. Such bonderizing or surface treatment shall have no detrimental effect upon the galvanized coating and shall be in accordance with the best modern practice and with review of the Engineer.

2. Each alternate slat shall be provided at both ends with galvanized malleable iron endlocks; that is, wearing pieces to protect ends of slats from abrasion in guides. The thickness of endlock head shall be not less than d inch and each shall be attached to the slat with at least two (2) tinned rivets or galvanized bolts of adequate strength.

3. The Contractor shall furnish with the door shipment, without extra charge, two (2) extra slats of each section, in greatest length used, to be substituted for slats removed at random by the Engineer for checking specification requirements.

4. The slats shall be provided with galvanized malleable iron windlocks on both ends of slats. The windlocks shall, under excessive wind pressure, engage locking bars in curtain guides and prevent the curtain from leaving the guides.

5. The design of curtain slat, windlock, curtain guide, fastenings, and clearances before engagement of windlocks, shall be based on the wind pressure stated under subheading 4.03, but shall provide for failure in some part of curtain or guides before the pressure is double the design pressure, to avoid overstraining the shed framing. The initial windlock clearance must be such as to permit operation of the curtain with the specified pull on the hand-chain when there is no appreciable wind.

6. The curtain shall have a bottom bar made of two galvanized angles not smaller in any dimension that called for under subheading 4.03, back to back with short leg vertical, securely bolted or riveted to a

suitably formed bottom slat. Other arrangements of equal stiffness perpendicular to the curtain will be permitted. Fastenings shall be galvanized.

7. The bottom of the door shall be provided with loop-type rubber astragal, suspended between the two bottom bar angles, to provide compressible rubber close seating on the sill.

8. All bolts used on the curtain shall be galvanized and all rivets shall be tinned.

9. The top of the curtain shall be securely attached to each of the malleable iron spiral rings on the curtain drum, or shall be securely attached directly to the drum.

B. Curtain Drum or Spring Barrel: The design of the drum, and shafting on which it is mounted shall be such as to provide the following features; a secure and simple arrangement for fastening the top of the curtain to pipe barrel rings, so that curtain renewals may be made easily in the field; sufficient strength and rigidity of the barrel and supporting shaft to avoid excessive strains and deflection.

1. The spring barrel shall be of heavy steel pipe of a size designed to allow not more than .03 inch deflection per foot of barrel length, but not less than the minimum size given under subheading 4.03. The barrel pipe shall have the standard mill protective coating.

2. The ends of the barrel shall be enclosed by cast iron plugs and journalled on cold rolled polished steel shafting supported by side bracket bearings. The end plugs shall be machined to fit the barrel.

3. If the barrel diameter is not sufficient for properly coiling the curtain designated under subheading 4.03, involute-shaped rings of cast malleable iron shall be mounted on the pipe barrel at approximately three (3) foot intervals. Barrel rings shall be provided with a lug to engage a hole in the pipe barrel, to insure proper alignment of the rings and prevent slippage.

4. The driving shaft and the spring tension shaft of the spring barrel assembly shall be cold rolled polished steel of adequate diameter, but not less than the minimum stated under subheading 4.03.

5. The entire curtain spring barrel shall be mechanically assembled in such a manner as to facilitate maintenance.

6. The end plugs shall be set with countersunk machine screws (no

welding).

7. The drum shall be shipped with all internal parts assembled. External collars for curtain may be shipped either attached to drum or separately.

C. Counterbalance: The weight of the curtain shall be counterbalanced by means of multiple springs. The multiple counterbalancing springs shall be furnished in number and size, as required, to properly balance the curtains. The springs shall be of high grade oil tempered and heat treated round steel wire, wound in helical form. The multiple spring assembly shall be fully enclosed in the pipe barrel. Each spring shall be attached at one end to a common tension shaft extending through the barrel, and attached at the other end to iron plugs anchored to the pipe barrel. This one tension shaft which holds one end of all springs, shall extend through the barrel and be supplied with an adjusting wheel readily accessible on the outside of the supporting bracket, in such a manner that tension on each and every spring of the multiple assembly can be simultaneously increased or decreased by means of the one adjusting wheel, which can be suitably anchored to the supporting bracket.

1. The springs shall have a high factor of safety and shall be at least strong enough to allow them to be wound two complete turns more than necessary to balance the entire weight of the curtain, without being damaged.

D. Curtain Drum Brackets: The brackets for support of the curtain drum shall permit the curtain bottom to rise the full height of opening specified or designated.

1. These brackets shall be of steel or high grade cast gray iron, with a web thickness of not less than d inch and with flanges and ribs of proper proportions. The curtain drum shall be so centered on these brackets that the angle at which the curtain enters the guides shall be a minimum.

E. Bearings: The bearings in the main hub of the supporting brackets, and in the load-carrying end plug of the spring barrel, shall carry the curtain and spring barrel load, and shall be ball or roller bearings of proper design and adequate capacity, grease packed and sealed, requiring no further lubrication.

F. Curtain Guides: The curtain guides shall be made up of structural steel shapes, plates and fastenings of adequate section, thickness and size, meeting requirements of ASTM Designation A 36, latest revision, assembled in a suitable design and arrangement of guiding and retaining the curtain, and for attachment to the door posts. Dimensions and thicknesses shall

meet the minimum requirements specified.

1. The top ends of the guides shall be curved for receiving the curtain at the varying angles of entrance. This feature may be provided for in the groove mouth or in the structural steel part of the guides.

2. The guides shall be attached to the building structure with the proper number and size of bolts to obtain the anchorage required for the specified wind load.

3. The curtain ends or endlocks shall be retained in position when coiling, by a winding surface operating or holding a position in direct line with the back of the curtain guiding grooves.

4. Bolts for attaching guides to building columns or posts shall be furnished, however, punching or drilling as required in the attachments (for guides to columns or posts) will be done at job site by erector.

G. Motor Operating Mechanism: Each door shall have a motor operated mechanism having an electric power unit with separate reduction gearing, and shall be equipped with emergency hand-chain operation. The complete mechanism shall be a compact unit requiring minimum side clearance.

1. All electrical equipment shall meet the requirements of Article 500 for Class III, Division 2, Hazardous Locations of the National Electrical Code, latest revision, and current requirements of the Property Insurance Association of Louisiana. All electrical installation and testing shall also conform to applicable sections of these specifications. This electrical equipment shall have the usually provided terminal leads for external connections (external wiring by others). Leads shall be tagged or numbered for identification with the wiring diagram furnished by the manufacturer.

2. The component parts of this operating equipment shall be as follows:

   a. THE MOTOR, of not less than one and one-half horsepower capacity, high starting torque, elevator or hoist type, ball bearing, totally enclosed with cast iron terminal housing, to operate on current Characteristic of 220/440 volts, 3 phase and 60 cycles

   b. A.C., with motor operation, the curtain shall travel at an approximate average rate of nine (9) inches per second. Removal of motor shall not interfere with operation of the emergency hand-claim.

c. THE REDUCTION GEAR for the power unit, consisting of a separate, machine cut worm gear set, completely housed to run in an oil bath.

d. THE MOTOR BRAKE for the power unit, fitted with a suitable spring-set solenoid-operated magnetic brake. The solenoid shall have a "NEMA" Type 9 cast iron enclosure.

e.. CONTROL SWITCHES, as follows:

(a) A three-button momentary contact push-button station, labeled "OPEN", "CLOSE", AND "STOP". This push-button station shall have a "NEMA" Type 9 enclosure, and shall be of the surface mounting type. The "STOP" button shall be equipped with a padlock type locking device.

(b) A remote control magnetic reversing starter, having three (3) overload relays and no-voltage protection in a "NEMA" Type 9 enclosure, with necessary interlock contacts for automatic push-button operation.

(c) Automatic limit switches in a "NEMA" Type 9 enclosure for upper and lower stop positions. A terminal strip shall be provided in limit switch for each field connection of all control wiring.

f. EMERGENCY HAND-CHAIN OPERATOR shall be included with each operating mechanism. It shall have a control for automatically engaging a sprocket and chain, and releasing the magnetic brake, and shall be operable from the floor. A device shall be provided to automatically prevent the motor from operating until emergency sprocket is disengaged. This device or interlocking switch shall have a "NEMA" Type 9 enclosure. Emergency operation shall not affect the timing of the limit switches.

1. The hand chain shall be of galvanized steel or wrought iron with well formed links, meshing properly with the chain wheel, strong and durable, of proof test of five hundred (500) pounds or more.

2. To secure this chain, there shall be a lug, staple or other fastening on the curtain guide about four (4) feet from the ground, with a pin on a light chain and a hole for a padlock. The Board will provide the padlock.

H. Protective Coatings: All exposed elements of the door assembly, except as noted hereinafter, shall be hot dip galvanized by the manufacturer with a tight, uniform coating of zinc, in accordance with the following schedule:

1. Curtain slats 1.25 oz. per sq. ft. as specified under subheading 5.01 above.

2. All other exposed parts, including but not necessarily limited to curtain guides, brackets, endlocks, windlocks, adjusting wheel, chain, chain guard, bottom angles, bolts, nuts, washers, and similar items shall receive coating of at least 1.25 oz. per sq. ft. in accordance with current applicable ASTM Method for each particular item coated.

3. Such items as curtain drum or spring barrel, polished shafts, bearings, and similar items shall not be galvanized. Curtain drum shall receive manufacturer's standard rust inhibiter primer at the factory. Prior to erection, Contractor shall field coat curtain drum with one (1) COAT OF "DRYGLAV" as manufactured by Force Chemicals Division of American Solder and Flux Co., Inc., of Paoli, Pennsylvania, or approved equal zinc coating.

4. All coated elements shall be fabricated, handled and shipped in such manner as not to damage the coating in any way. Damage to galvanized coating of any element or elements of the assembly shall be cause for rejection.

5. Whenever base metal is exposed for any reason after coating, such as drilling holes for erection, or where minor damage may occur to very limited areas, these areas shall be immediately cleaned to the satisfaction of the Engineer and given two (2) coats of ZINC DUST-ZINC oxide PRIMER, meeting Federal Specification TT-P-641 D, Type II, latest revision.

6. Whenever required elsewhere in the specifications the manufacturer, after bonderizing, shall further coat all elements as specified. Refer to "Section 9900 - Coatings".

PART 3-EXECUTION

6. EXAMINATION

A. Verify that opening sizes, tolerances and conditions are acceptable.

7. INSTALLATION

A. Install door unit assembly in accordance with manufacturer's printed instructions.

B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.

C. Securely brace components suspended from structure.

D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.

E. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 07900.

F. After completing installation, including work by other trades, lubricate, test and adjust doors to operate easily, free from warp, twist, or distortion.

8. ADJUSTING AND TESTING

A. Upon completion of installation, including work by other trades, lubricate, test and adjust doors to operate easily, free from warp, twist, or distortion and fitting weathertight for the entire perimeter.

B. Train Owner's maintenance personnel on procedures and schedules related to door operation, servicing, preventive maintenance, and procedures for resetting closing devices after activation

END OF SECTION

SECTION 08410 - INTERIOR ALUMINUM ENTRANCES AND STOREFRONT

PART 1 - GENERAL

1. SECTION INCLUDES

A. Aluminum entrance doors and frames.

B. Aluminum storefront.

C. Door hardware.

2. REFERENCES

A. AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.

B. AAMA - Curtain Wall Manual #10 - Care and Handling of Architectural Aluminum From Shop to Site.

C. AAMA 501 - Methods of Test for Metal Curtain Walls.

D. AAMA SFM-1 - Aluminum Storefront and Entrance Manual.

E. ADA - American with Disabilities Act of 1990, Title III (Accessibility Regulations for Private Entities) and latest amendments (if any).

F. ANSI A117.1 - Safety Standards for the Handicapped.

G. ANSI/ASTM A386 - Zinc Coating (Hot Dip) on Assembled Steel Products.

H. ANSI/ASTM A446 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.

I. ANSI/ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.

J. ANSI/ASTM B221 - Aluminum-Alloy Extruded Bar, Rod, Wire, Shape, and Tube.

3. SUBMITTALS

A. Shop Drawings: Submit for each aluminum entrance and storefront system required, including:

1. System dimensions.

2. Framed opening requirements and tolerances.

3. Layout and installation details, including relationship to and inclusion of adjacent work.

4. Elevations at 1/4 inch scale.

5. Detail sections of typical composite members.

6. Anchors and reinforcement.

7. Hardware mounting heights.

8. Provisions for expansion and contraction.

9. Glazing details.

B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware and internal drainage details.

C. Hardware Schedule: Submit complete hardware schedule organized into sets based on hardware specified. Coordinate hardware with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish. Include item name, name of the manufacturer and complete designations of every item required for each door opening.

D. Samples: Submit two samples 2 x 4 inches in size illustrating pre-finished aluminum surface.

4. QUALITY ASSURANCE

A. Perform Work in accordance with AAMA SFM-1 and AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.

B. Conform to requirements of ANSI A117.1.

C. Comply with requirements of the American with Disabilities Act of 1990, Title III (Accessibility Regulations for Private Entities) and latest amendments (if any).

5. QUALIFICATIONS

A. Manufacturer and Installer: Company specializing in manufacturing aluminum glazing systems with minimum three years documented experience.

6. PRE-INSTALLATION CONFERENCE

A. Convene one week prior to commencing work of this Section.

7. DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01600.

B. Handle work of this section in accordance with AAMA - Curtain Wall Manual #10.

C. Protect pre-finished aluminum surfaces with wrapping or stripable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

8. ENVIRONMENTAL REQUIREMENTS

A. Do not install sealants when ambient temperature is less than 40 degrees F during and 48 hours after installation.

9. FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

10. WARRANTY

A. Provide three year warranty under provisions of Section 01700.

B. Warranty: Include coverage for complete system for failure to meet specified requirements.

PART 2 - PRODUCTS

11. MANUFACTURERS-ENTRANCE, STOREFRONT, AND PUNCHED WINDOWS

A. Series Trifab 450 Flush Glazing System - Inside glazed with 350 medium stile doors by Kawneer or equal by U.S. Aluminum Corp. or and Vistawall.

12. MATERIALS

A. Extruded Aluminum: ANSI/ASTM B221; 6063 alloy, T5 temper for doors, door frames, fixed glass sidelights, storefronts and transoms, T6 temper for extruded structural members.

B. Sheet Aluminum: ANSI/ASTM B209; alloy and temper suitable for use.

C. Fasteners: Non-magnetic stainless steel or aluminum or other materials warranted by manufacturer to be non-corrosive and compatible with aluminum components.

1. Do not use exposed fasteners except where unavoidable for application of hardware.

2. Provide any exposed fasteners with phillips flat head machine screws with finish to match finish of members and hardware being fastened.

D. Compression Weatherstripping: Manufacturer's standard replaceable compressible weatherstripping gaskets of molded neoprene complying with ASTM D 2000 or molded PVC complying with ASTM D 2287.

E. Sliding Weatherstripping: Manufacturer's standard replaceable weatherstripping of wool, polypropylene, or nylon woven pile, with nylon fabric or aluminum strip backing, complying with AAMA 701.2.

13. COMPONENTS

A. Storefront Framing System: Provide storefront and entrance framing systems fabricated from extruded aluminum members of size and profile indicated. Include subframes and other reinforcing members of the type indicated. Provide for flush glazing storefront from the exterior on all sides without projecting stops. Shop-fabricate and preassemble frame components where possible. Provide storefront frame sections without exposed seams.

1. Profile: 1-3/4" face by 4-1/2" deep for monolithic glass.

2. Mullion Configurations: Provide pockets at the inside glazing face to receive resilient elastomeric glazing. Mullions and horizontals shall be one piece. Make provisions to drain moisture accumulation to the exterior.

B. Entrance Door Frames: Provide tubular and channel frame entrance door frame assemblies, as indicated, with welded joints in accordance with manufacturer's standards. Reinforce as necessary to support required loads.

C. Stile-and-Rail Type Entrance Doors: Provide tubular frame members, fabricated with welded joints.

1. Glazing: Fabricate doors to facilitate replacement of glass or panels, without disassembly of stiles and rails. Provide snap-on extruded aluminum square glazing stops, with exterior stops anchored for nonremoval.

2. Design: Provide 1-3/4 inch thick doors of design indicated.

a. Medium stile (3-1/2 inch nominal width for top and vertical stiles and 6-1/2 inch wide bottom rail).

14. GLASS AND GLAZING MATERIALS

A. Glass and Glazing Materials: As specified in Section 08800 of Types described below:

1. Glass in Storefront: 1/4" monolithic clear tempered glass.
2. Glass in Storefront Doors: 1/4" monolithic tempered clear glass.

B. Gaskets: Manufacturer standard neoprene or EPDM wedge type gaskets produced for the specified framing system.

15. HARDWARE

A. Provide heavy-duty hardware units as indicated, scheduled, or required for operation of each door, including the following items of sizes, number, and type recommended by manufacturer for service required; finish to match doors unless otherwise indicated:

1. Ball-Bearing Butts: 5 knuckle, 2 bearings, steel ball bearing butts sized to comply with ANSI A 156.1, Grade 1. Provide 2 butts for doors 7 feet 6 inches or less; provide 3 butts for taller and heavier doors.

2. Surface-Mounted Overhead Closers: Modern type with cover, for parallel-arm-type mounting installation. Comply with ANSI A 156.4, Grade 1. Comply with manufacturer's recommendations for closer size, depending on door size, exposure to weather and anticipated frequency of use. Include the following:

a. Approved: 4041 by LCN

b. Hold-open-arm.

c. Delayed-action closing.

d. Complying with requirements of ADA.

3. Door Stop: Floor or wall-mounted door stop, as appropriate, with integral rubber bumper; comply with ANSI A 156.16, Grade 1.

4. Cylinders: Mortise type, 6-pin tumbler, cylinder units with cast aluminum face; comply with ANSI A 156.5, Grade 1; coordinate with section 08710 and Owner for keying requirements.

5. Thumb-Turns: Inside thumb-turn cylinders of cast aluminum alloy.

6. Deadlocks: Mortised maximum security deadlock, with minimum 1 inch long pivoted bolt and stainless steel strike box; comply with ANSI A 156.5, Grade 1.

7. Pull Handles: Aluminum tubular pull handles of style indicated.

8. Push Bars: Aluminum push bars of tubular style indicated.

16. FABRICATION

A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.

C. Prepare components to receive anchor devices. Fabricate anchors.

D. Arrange fasteners and attachments to conceal from view.

E. Reinforce interior horizontal head rail to receive closer.

F. Prepare components with internal reinforcement for door hardware and door operator hinge hardware.

G. Reinforce framing members for imposed loads.

17. FINISHES

A. Class I Clear Anodized Finish: AA-M12C22A41 (Mechanical Finish: as fabricated, nonspecular; Chemical Finish: etched, medium matte; Anodic Coating: Class I Architectural, clear film thicker than 0.7 mil) complying with AAMA 607.1

PART 3 - EXECUTION

18. EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify wall openings and adjoining materials are ready to receive work of this Section.

19. INSTALLATION

A. Install wall system in accordance with manufacturer's instructions and AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Install hardware using templates provided.

F. Install glass in accordance with to glazing method required to achieve performance criteria and referenced standards fro an airtight permanent installation.

20. TOLERANCES

A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 1/16 inches per 10 ft, whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

21. ADJUSTING

A. Adjust operating hardware and sash for smooth operation.

22. CLEANING

A. Clean work under provisions of 01700.

B. Remove protective material from pre-finished aluminum surfaces.

C. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe

surfaces clean.

D. Remove excess sealant by method acceptable to sealant manufacturer.

23. PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Section 01500.

B. Protect finished Work from damage.

END OF SECTION

SECTION 08710 - DOOR HARDWARE

PART 1 - GENERAL

1. RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

2. SUMMARY

A. This Section includes items known commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.

B. This Section includes the following:

1. Hinges
2. Lock cylinders and keys
3. Lock and latch sets
4. Bolts
5. Exit devices
6. Push/Pull units
7. Closers
8. Overhead holders
9. Miscellaneous door control devices
10. Door trim units
11. Protection plates
12. Weatherstripping for exterior doors
13. Astragals or meeting seals on pairs of doors
14. Thresholds

C. Related Sections: The following Sections contain requirements that relate to this Section:

1. Section 08110: Steel Doors and Frames

2. Section 08210: Wood Doors

3. Section 08410: Aluminum Entrances and Storefronts

4. Division 16: Electrical

D. Products furnished but not installed under this Section to include:

1. Cylinders for locks on entrance doors.

2. Final replacement cores and keys to be installed by Owner.

3. REFERENCES

A. Standards of the following as referenced:

1. American National Standards Institute (ANSI)

2. Door and Hardware Institute (DHI)

3. Factory Mutual (FM)

4. National Fire Protection Association (NFPA)

5. Underwriters' Laboratories, Inc. (UL)

a. UL 10C - Fire Tests Door Assemblies

6. Warnock Hersey

B. Regulatory standards of the following as referenced:

1. Department of Justice, Office of the Attorney General, *Americans with Disabilities Act*, Public Law 101-336 (ADA).

2. CABO/ANSI A117.1: *Providing Accessibility and Usability for Physically Handicap People*, 1992 edition.

4. SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification sections.

B. Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements. For items other than those scheduled in the “Headings” of Section 3, provide catalog information for the specified items and for those submitted.

C. Final hardware schedule coordinated with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Final Hardware Schedule Content: Based on hardware indicated, organize schedule into vertical format “hardware sets" indicating complete designations of every item required for each door or opening. Use specification Heading numbers with any variations suffixed a, b, etc. Include the following information:

a. Type, style, function, size, and finish of each hardware item.

b. Name and manufacturer of each item.

c. Fastenings and other pertinent information.

d. Location of each hardware set cross-referenced to indications on Drawings both on floor plans and in door and frame schedule.

e. Explanation of all abbreviations, symbols, and codes contained in schedule.

f. Mounting locations for hardware.

g. Door and frame sizes and materials.

h. Keying information.

i. Cross-reference numbers used within schedule deviating from those specified.

1) Column 1: State specified item and manufacturer.

2) Column 2: State prior approved substituted item and its manufacturer.

2. Submittal Sequence: Submit final schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work that is critical in the Project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by door hardware, and other information

essential to the coordinated review of schedule.

3. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.

D. Samples, if requested, of each type of exposed hardware unit in finish indicated and tagged with full description for coordination with schedule. Submit samples prior to submission of final hardware schedule.

1. Samples will be returned to the supplier. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated in the Work, within limitations of keying coordination requirements.

E. Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

F. Contract closeout submittals:

1. Operation and maintenance data: Complete information for installed door hardware.

2. Warranty: Completed and executed warranty forms.

5. QUALITY ASSURANCE

A. Single Source Responsibility: Obtain each type of hardware (latch and locksets, hinges, closers, etc.) from a single manufacturer.

B. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that employs an experienced architectural hardware consultant (AHC) who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work, for consultation.

1. Require supplier to meet with Owner to finalize keying requirements and to obtain final instructions in writing.

2. Required supplier to meet with installer prior to beginning of installation of door hardware. (Pre-installation conference)

C. The hardware manufacturer's representative(s) shall conduct a pre-installation conference with the Contractor's installer, a representative of the county

planning and/or maintenance department, and a representative of the hardware supplier, to demonstrate product installation and adjustment in accordance with manufacturer's recommendations and Owner's requirements.

D. Hardware manufacturers' representative shall inspect hardware installation to confirm that all products are installed and adjusted according to manufacturers recommendations. A certificate of compliance shall be submitted with the project closeout documents.

E. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and tested by UL or Warnock Hersey for given type/size opening and degree of label. Provide proper latching hardware, door closers, approved-bearing hinges and seals whether listed in the Hardware Schedule or not. All hardware shall comply with standards UBC 702 (1997) and UL 10C.

1. Where emergency exit devices are required on fire-rated doors, (with supplementary marking on doors' UL labels indicating "Fire Door to be equipped with Fire Exit Hardware") provide UL label on exit devices indicating "Fire Exit Hardware".

6. PRODUCT HANDLING

A. Tag each item or package separately with identification related to final hardware schedule, and include basic installation instructions with each item or package.

B. Packaging of door hardware is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.

C. Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.

D. Deliver individually packaged door hardware items promptly to place of installation (shop or Project site).

E. Provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of the Work will not be delayed by hardware losses both before and after installation.

7. WARRANTY

A. Special warranties:

1. Door Closers: Ten year period

2. Exit Devices: Three year period

3. Locks and Cylinders: Three year period

8. MAINTENANCE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

9. MANUFACTURED UNITS

(*Denotes manufacturer referenced in the Hardware Headings)

A. Hinges:

1. Acceptable manufacturers:

a. Hager Hinge Company

b. Stanley Works

c. Ives

d. Bommer*

2. Characteristics:

a. Templates: Provide only template-produced units.

b. Screws: Provide Phillips flat-head screws complying with the following requirements:

1) For metal doors and frames install machine screws into drilled and tapped holes.

2) For wood doors and frames install threaded-to-the-head wood screws.

3) For fire-rated wood doors install #12 x 1-1/4 inch, threaded-to-the-head steel wood screws.

4) Finish screw heads to match surface of hinges or pivots.

c. Hinge pins: Except as otherwise indicated, provide hinge pins as follows:

1) Out-Swing Exterior Doors: Non-removable pins.

2) Out-Swing Corridor Doors with Locks: Non-removable pins.

3) Interior Doors: Non-rising pins.

4) Tips: Flat button and matching plug. Finished to match leafs.

d. Size: Size hinges in accordance with specified manufacturer's published recommendations.

e. Quantity: Furnish one pair of hinges for all doors up to 5'0" high. Furnish one hinge for each additional 2-1/2 feet or fraction thereof.

B. Continuous Hinges:

1. Acceptable manufacturers:

a. Markar

b. Select Products*

c. Stanley

2. Characteristics:

a. Continuous gear hinges to be manufactured of extruded 6063-T6 aluminum alloy with anodized finish, or factory painted finish as scheduled.

b. All hinges are to be manufactured to template. Uncut hinges shall be non-handed and shall be a pinless assembly of three interlocking extrusions applied to the full height of the door and frame without mortising.

c. Vertical door loads shall be carried on chemically lubricated polyacetal thrust bearings. The door and frame leaves shall be continually geared together for the entire hinge length and secured with a full cover channel. Hinge to operate to a full 180^{o}.

d. Hinges to be milled, anodized and assembled in matching pairs. Fasteners supplied shall be 410 stainless steel, plated and hardened.

e. Provide UL listed continuous hinges at fire doors. Continuous hinges at fire doors (suffix -FR) shall meet the required ratings without the use of auxiliary fused pins or studs.

C. Cylinders:

1. Acceptable manufacturers:

a. Best*

2. Characteristics:

a. Provide a new Grand Master Key System for Project..

b. Equip locksets with interchangeable core cylinders.

c. Furnish final cores and keys for installation by Owner.

d. All existing locks to be keyed to new system

e. Metals: Construct lock cylinder parts from brass or bronze, stainless steel, or nickel silver.

f. Comply with Owner's instructions for master keying and, except as otherwise indicated, provide individual change key for each lock that is not designated to be keyed alike with a group of related locks.

1) Permanently inscribe each key with number of lock that identifies cylinder manufacturer's key symbol, and notation, “DO NOT DUPLICATE."

g. Key Material: Provide keys of nickel silver only.

h. Key Quantity: Furnish 3 change keys for each lock, 5 master keys for each master system, 3 grandmaster keys for each grandmaster system, and 3 control keys for interchangeable core series.

1) Furnish one extra blank for each lock.

2) Deliver keys to Owner.

D. Locksets, Latchsets, Deadbolts:

1. Acceptable manufacturers:

   a. Best*

   b. Sargent

   c. Schlage

2. Mortise Locksets and Latchsets: as scheduled.

   a. Chassis: cold-rolled steel, handing field-changeable without disassembly.

   b. Latchbolts: 3/4-inch throw stainless steel anti-friction type.

   c. Lever Trim: through-bolted, accessible design, cast or solid rod lever as scheduled. Spindles: independent break-away.

   d. Thumbturns: accessible design not requiring pinching or twisting motions to operate.

   e. Deadbolts: stainless steel 1-inch throw.

   f. Electric operation: Manufacturer-installed continuous duty solenoid.

   g. Strikes: 16 gage curved stainless steel, bronze or brass with 1" deep box construction, lips of sufficient length to clear trim and protect clothing.

   h. Scheduled Lock Series and Design: Best 45H series, 14H design.

   i. Certifications:

      1) ANSI A156.13, 1994, Grade 1 Operational, Grade 1 Security.

      2) ANSI/ASTM F476-84 Grade 30 UL Listed.

E. Exit Devices:

1. Acceptable manufacturers:

   a. Von Duprin

   b. Precision*

   c. Sargent

2. Characteristics:

a. Exit devices shall be "UL" listed for life safety. All exit devices for fire rated openings shall have “UL" labels for “Fire Exit Hardware."

b. All exit devices mounted on labeled wood doors shall be mounted on the door per the door manufacturer’s requirements.

c. All trim shall be thru-bolted to the lock stile case. Lever design to match locksets.

d. All exit devices shall be made of brass, bronze, stainless steel, or aluminum material, powder coated, anodized, or plated to the standard architectural finishes to match the balance of the door hardware.

e. Provide glass bead conversion kits to shim exit devices on doors with raised glass heads.

f. All exit devices shall be one manufacturer. No deviation will be considered.

g. All exit devices shall be non-handed. Touchpad shall extend a minimum of 1/2 of the door width and shall extend to the height of the cross rail housing for a “no pinch” operation. Plastic touchpads are not acceptable. All latchbolts to be the deadlocking type.

h. Lever trim shall be solid case material with a break-away feature to limit damage to the unit from vandalism.

i. Surface vertical rod devices shall be UL labeled for fire door applications without the use of bottom rod assemblies. Where bottom rods are required for security applications, the devices shall be UL labeled for fire doors applications with rod and latch guards by the device manufacturer.

F. Closers and Door Control Devices:

1. Acceptable manufacturers:

a. LCN* 4011/4111 Series

b. Sargent 281 Series

c. Corbin Russwin DC6000 Series

2. Characteristics:

a. Door closers shall have fully hydraulic, full rack and pinion action.

b. All closers shall utilize a stable fluid withstanding temperature range of 120°F to -30°F without seasonal adjustment of closer speed to properly close the door. Closers for fire-rated doors shall be provided with temperature stabilizing fluid that complies with standards UBC 7-2 (1997) and UL 10C.

c. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force for the physically handicapped. Spring power adjustment (LCN Fast ™ Power Adjust) allows for quick and accurate power adjustment and visually shows closer power size settings by way of dial adjustment gauge located on closer spring tube. Hydraulic regulation shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed and back check.

d. All closers shall have solid forged steel main arms (and forearms for parallel arm closers) and where specified shall have a cast-in solid stop on the closer shoe ("DS"). Where door travel on out-swing doors must be limited, use "DS" type closers. Auxiliary stops are not required when cush type closers are used.

e. All closers (overhead, surface and concealed) shall be of one manufacturer and carry manufacturer's ten year warranty (electric closers to have two year warranty).

f. Access-Free Manual Closers: Where manual closers are indicated for doors required to be accessible to the physically handicapped provide adjustable units complying with ADA and ANSI A-117.1 provisions for door opening force.

g. Closers to be installed to allow door swing as shown on plans. Doors swinging into exit corridors shall provide for corridor clear width as required by code. Where possible, mount closers inside rooms.

h. Powder coating finish to be certified to exceed 100 hours salt spray testing by ETL, an independent testing laboratory used by BHMA for ANSI certification.

i. Magnetic Door Holders to be heavy duty wall or floor mounted with metal housing and complete mounting hardware. Provide 24V holding coils unless otherwise scheduled.

G. Overhead Door Holders:

1. Acceptable manufacturers:

a. Glynn Johnson*

b. Rixson Firemark

2. Characteristics:

a. Provide heavy duty and medium duty surface mounted door stops of stainless steel..

b. Surface holders to be installed with the jamb bracket mounted on the stop.

H. Floor Stops and Wall Bumpers:

1. Acceptable manufacturers:

a. Trimco*

b. Ives*

c. Rockwood Manufacturing

2. Characteristics: Refer to Hardware Headings.

I. Door Bolts/Coordinators:

1. Acceptable manufacturers:

a. Trimco

b. Ives*

c. Rockwood Manufacturing

2. Characteristics:

a. Flush bolts to be forged brass 6-3/4" x 1", with 1/2" diameter bolts. Plunger to be supplied with milled surface one side that fits into a matching guide.

J. Push Plates:

1. Acceptable manufacturers:

a. Trimco

b. Ives

c. Rockwood Manufacturing*

2. Characteristics:

a. Exposed Fasteners: Provide manufacturers standard exposed fasteners.

b. Material to be stainless steel, per the Hardware Headings.

c. Provide plates sized as shown in Hardware Headings.

K. Door Pulls & Pull Plates:

1. Acceptable manufacturers:

a. Trimco

b. Ives

c. Rockwood Manufacturing*

2. Characteristics:

a. Provide concealed thru-bolted trim on back to back mounted pulls, but not for single units.

b. Material to be stainless steel.

c. Provide units sized as shown in Hardware Headings.

L. Protective Plates:

1. Acceptable manufacturers:

a. Trimco

b. Ives

c. Rockwood Manufacturing*

2. Characteristics:

a. Provide manufacturers standard exposed fasteners for door trim units consisting of either machine screws or self-tapping screws.

b. Materials:

1) Metal Plates: Stainless Steel, .050 inch (U.S. 18 gage).

c. Fabricate protection plates not more than 2 inches less than door width on hinge side and not more than 1 inch less than door width on pull side.

d. Heights:

1) Kick plates to be 10 inches in height.

M. Thresholds:

1. Acceptable manufacturers:

a. National Guard Products, Inc.*

b. Reese Industries

c. Pemko.

2. Types: Indicated in Hardware Headings.

N. Door Seals/Gasketing:

1. Acceptable manufacturers:

a. National Guard Products, Inc.*

b. Reese Industries

c. Pemko

2. Types: Indicated in Hardware Headings.

O. Silencers:

1. Acceptable manufacturers:

a. Hager

b. Ives*

c. Rockwood Manufacturing

2. Three for each single doors; four for pairs of doors.

P. Key Cabinet and System:

1. Acceptable manufacturers:

a. Telkee, Inc.

b. MMF

2. Provide a key control system including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150 percent of the number of locks required for the Project.

a. Provide complete cross index system set up by key control distributor, and place keys on markers and hooks in the cabinet as determined by the final key schedule.

b. Provide hinged-panel type cabinet for wall mounting.

10. MATERIALS AND FABRICATION

A. Manufacturer's Name Plate: Do not use manufacturers' products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise acceptable to Architect.

1. Manufacturer's identification will be permitted on rim of lock cylinders only.

B. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units by applicable ANSI/BHMA A156 series standards for each type of hardware item and with ANSI/BHMA A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.

C. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.

1. Do not provide hardware that has been prepared for self-tapping sheet

metal screws, except as specifically indicated.

2. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including “prepared for paint" surfaces to receive painted finish.

3. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent no standard units of type specified are available with concealed fasteners.

4. Do not use thru-bolts or sex bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means of adequately fastening the hardware, or otherwise found in Headings. Coordinate with wood doors and metal doors and frames where thru-bolts are used as a means of reinforcing the work, provide sleeves for each thru-bolt or use sex screw fasteners.

11. HARDWARE FINISHES

A. Match items to the manufacturer’s standard color and texture finish for the latch and lock sets (or push-pull units if no latch of lock sets).

B. Provide finishes that match those established by ANSI or, if none established, match the Architect’s sample.

C. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer’s standards, but in no case less than specified by referenced standards for the applicable units of hardware.

D. Provide protective lacquer coating on all exposed hardware finishes of brass, bronze, and aluminum, except as otherwise indicated. The suffix "-NL" is used with standard finish designations to indicate "no lacquer."

E. The designations used to indicate hardware finishes are those listed in ANSI/BHMA A156.18, "Materials and Finishes," including coordination with the traditional U.S. finishes shown by certain manufacturers for their products

1. Hinges (Exterior): 630 (US32D) Satin Stainless Steel

2. Hinges (Interior): 652 (US26D) Satin Chrome Plated Steel or as listed

3. Continuous Hinges: 628 (US28) Aluminum

4. Flush Bolts: 626 (US26D) Satin Chrome Plated Brass/Bronze

5. Locks: 626 (US26D) Satin Chrome

6. Exit Devices: 630 (US32D) Satin Stainless Steel

7. Door Closers: 689 Powder Coat Aluminum

8. Push Plates: 630 (US32D) Satin Stainless Steel

9. Pull Plates: 630 (US32D) Satin Stainless Steel

10. Protective Plates: 630 (US32D) Satin Stainless Steel

11. Door Stops: 626 (US26D) Satin Chrome Plated Brass/Bronze

12. Overhead Holders: 630 Satin Stainless Steel and 689 Powder Coated Steel (as scheduled)

13. Thresholds/Weatherstripping: 627/628 (US27/US28) Aluminum

PART 3 - EXECUTION

12. INSTALLATION

A. Mount hardware units at heights indicated in following applicable publications, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by Architect.

1. "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.

2. "Recommended Locations for Builders Hardware for Custom Steel Doors and Frames" by the Door and Hardware Institute.

3. NWWDA Industry Standard I.S.1.7, "Hardware Locations for Wood Flush Doors."

B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.

C. Set units level, plumb, and true to line and location. Adjust and reinforce the

attachment substrate as necessary for proper installation and operation.

D. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

E. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements specified in Division 7 Section “Joint Sealers”.

F. Weatherstripping and Seals: Comply with manufacturer's instructions and recommendations to the extent installation requirements are not otherwise indicated.

13. ADJUSTING, CLEANING, AND DEMONSTRATING

A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.

1. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to function properly with final operation of heating and ventilating equipment.

B. Clean adjacent surfaces soiled by hardware installation.

C. Door Hardware Supplier's Field Service

1. Inspect door hardware items for correct installation and adjustment after complete installation of door hardware.

2. Instruct Owner's personnel in the proper adjustment and maintenance of door hardware and hardware finishes.

3. File written report of this inspection to Architect.

D. Prior to project completion, representatives of the lock, exit device and overhead closer manufacturers shall inspect and adjust all units and certify that all units are installed in accordance with the manufacturer’s instructions, and are regulated properly and functioning correctly. A written report shall be provided to the Architect as to the inspection and shall include appropriate certificates.

14. **HARDWARE SCHEDULE**

HW SET: 1

DOOR NUMBERS:
1, 45, 46, 48, 49, 53, 54, 58, 59, 70, 101, 102, 134, 136

EACH TO HAVE:

2	EA	CYLINDERS 1E-72 OR 1E-74 AS REQUIRED	626

BALANCE OF HARDWARE BY DOOR MFG.

HW SET; 2

DOOR NUMBERS:
2

EACH TO HAVE:

2	EA	CONTINUOUS HINGES	SL24-HD	628
2	EA	EXIT DEVICE	2803 X C03	630
2	EA	RIM CYLINDERS	1E-74	636
2	EA	DOOR CLOSERS	4111-H CUSH	689
2	EA	KICK PLATE	K1050 8” X 5” LDW	630
1	SET	ASTRAGAL	600A	628
1	EA	THRESHOLD	896 V	628
1	SET	GASKETING	2525B BRN	

HW SET: 3

DOOR NUMBERS:
103, 110

EACH TO HAVE:

3	EA	HINGES	BB5000	652
1	EA	ENTRY LOCK	45H-7AB-14H	626
1	EA	DOOR CLOSER	4011	689
1	EA	WALL STOP	WS407CVX	630
3	EA	DOOR SILENCERS	SR64 GRY	

HW SET: 3A

DOOR NUMBERS:
164

EACH TO HAVE:

3	EA	HINGES	BB5000	652	
1	EA	ENTRY LOCK	45H-7AB-14H	626	
1	EA	DOOR CLOSER	1461 EDA	689	
1	EA	WALL STOP	WS407CVX	630	
3	EA	DOOR SILENCERS	SR64	GRY	

HW SET: 4

DOOR NUMBERS:
104, 105, 106, 129, 130, 167, 173, 174, 175, 176, 183, 179, 180, 181, 182. 185, 189

EACH TO HAVE:

3	EA	HINGES	BB5000	652	
1	EA	OFFICE LOCK	45H-7A-14H	626	
1	EA	WALL STOP	WS407CVX	630	
3	EA	DOOR SILENCERS	SR64	GRY	

HW SET: 5

DOOR NUMBERS:
111, 193

EACH TO HAVE:

6	EA	HINGES	BB5000	652	
1	EA	STOREROOM LOCK	45H-7D-14H	626	
1	EA	DOOR CLOSER	1461 OR 1461 EDA (ACT LEAF)	689	
2	EA	FLUSH BOLTS	FB458	626	
1	EA	DUST PROOF STRIKE	DP2	626	
2	EA	FLOOR STOPS	1211	626	
1	SET	ASTRAGAL	600A	628	
4	EA	DOOR SILENCERS	SR64	GRY	

HW SET: 6

DOOR NUMBERS:
112, 117, 132, 135, 184

EACH TO HAVE:

3	EA	HINGES	BB5000	652
1	EA	STOREROOM LOCK	45H-7D-14H	626
1	EA	DOOR CLOSER	1461	626
1	EA	FLOOR STOP	1211	626
1	EA	KICK PLATE	K1050 8” X 2” LDW	63
3	EA	DOOR SILENCERS	SR64	GRY

HW SET: 7

DOOR NUMBERS:
113, 114, 154, 158, 197, 198, 202, 203

EACH TO HAVE:

2	EA	CONTINUOUS HINGES	SL11-HD	628
2	EA	EXIT DEVICE	2203 X CA-03 X LBR	630
2	EA	RIM CYLINDER	1E-72	626
2	EA	DOOR CLOSERS	4111 CUSH	689
2	EA	PULLS	BF158	630
2	EA	KICK PLATES	K1050 8” X 1” LDW	630
4	EA	DOOR SILENCERS	SR64	GRY

HW SET: 7A

EACH TO HAVE:
213, 216

EACH TO HAVE:

2	EA	CONTINUOUS HINGES	SL11-HD	628
2	EA	EXIT DEVICE	2203 X CA-03 X LBR	630
2	EA	RIM CYLINDER	1E-72	626
2	EA	DOOR CLOSERS	4111 EDA	689
2	EA	WALL STOPS	WS407CVX	630
2	EA	PULLS	BF158	630
2	EA	KICK PLATES	K1050 8” X 1” LDW	630
4	EA	DOOR SILENCERS	SR64	GRY

HW SET: 8

DOOR NUMBERS:
115, 119

EACH TO HAVE:

3	EA	HINGES	BB5006		630
1	EA	DOOR CLOSER	4011		689
1	EA	FLOOR STOP	1211		626
1	EA	PUSH PLATE	70C	4 X 16	630
1	EA	PULL PLATE	110 X 70C		630
1	EA	KICK PLATE	K1050	8” X 2” LDW	630
3	EA	DOOR SILENCERS	SR64		GRY

HW SET: 9

DOOR NUMBERS:
116, 118

EACH TO HAVE:

3	EA	HINGES	BB5006		630
1	EA	DEADLOCK	45H-7RD		626
1	EA	DOOR CLOSER	4011		689
1	EA	FLOOR STOP	1211		626
1	EA	PUSH PLATE	70C	4 X 16	630
1	EA	PULL PLATE	110 X 70C		630
1	EA	KICK PLATE	K1050	8” X 2” LDW	630
3	EA	DOOR SILENCERS	SR64		GRY

HW SET: 10

DOOR NUMBERS:
120, 121, 131, 190

EACH TO HAVE:

3	EA	HINGES	BB5000		652
1	EA	CLASSROOM LOCK	45H-7R-14H		626
1	EA	DOOR CLOSER	4011 OR 4111 EDA AS REQ.		689
1	EA	FLOOR STOP	1211		626
1	EA	KICK PLATE	K1050	8” X 2” LDW	630
3	EA	DOOR SILENCERS	SR64		GRY

HW SET: 11

DOOR NUMBERS:
122, 123, 140

EACH TO HAVE:

2	EA	CONTINUOUS HINGE	SL11-HD	628
2	EA	EXIT DEVICES	FL2208 X 4900D X LBR	630
2	EA	RIM CYLINDERS	1E-74	626
2	EA	DOOR CLOSERS	4111 EDA	689
2	EA	MAG HOLDERS	998	689
2	EA	KICK PLATES	K1050 8” X 1” LDW	630
1	SET	ASTRAGAL	600A	628
4	EA	DOOR SILENCERS	SR64	GRY

NOTE: ELECTRICAL CONNECTION REQUIRED
HW SET: 11A

DOOR NUMBERS:
142

EACH TO HAVE:

2	EA	CONTINUOUS HINGE	SL11-HD	628
2	EA	EXIT DEVICES	FL2208 X 4900D X LBR	630
2	EA	RIM CYLINDERS	1E-74	626
2	EA	DOOR CLOSERS	4111 CUSH	689
2	EA	KICK PLATES	K1050 8” X 1” LDW	630
1	SET	ASTRAGAL	600A	628
4	EA	DOOR SILENCERS	SR64	GRY

HW SET: 12

DOOR NUMBERS:
124

EACH TO HAVE:

2	EA	CONTINUOUS HINGE	SL11-HD	628
2	EA	EXIT DEVICES	FL2208 X 4900D X LBR	630
2	EA	RIM CYLINDERS	1E-74	626
2	EA	DOOR CLOSERS	4111 EDA	689
2	EA	FLOOR STOPS	1211	626
2	EA	MAGNETIC HOLDERS	998	689
2	EA	KICK PLATES	K1050 8” X 1” LDW	630
1	SET	ASTRAGAL	600A	628

4 EA DOOR SILENCERS SR64 GRY

HW SET: 13

DOOR NUMBERS:
150, 153, 201, 204, 207, 210, 211

EACH TO HAVE:

3	EA	HINGES	BB5000	652
1	EA	STOREROOM LOCK	45H-7D-14H	626
1	EA	DOOR CLOSER	1461 CUSH	626
1	EA	KICK PLATE	K1050 8” X 2” LDW	63
3	EA	DOOR SILENCERS	SR64	GRY

HW SET: 14

DOOR NUMBERS:
149, 151, 152, 215

EACH TO HAVE:

6	EA	HINGES	BB5000	652
1	EA	STOREROOM LOCK	45H-7D-14H	626
1	EA	DOOR CLOSER	1461 CUSH (ACT LEAF)	689
2	EA	FLUSH BOLTS	FB458	626
1	EA	DUST PROOF STRIKE	DP2	626

HW SET: 15

DOOR NUMBERS:
133

EACH TO HAVE:

1	EA	CONTINUOUS HINGE	SL11-HD	628
1	EA	EXIT DEVICE	2103 X CA-03	630
1	EA	RIM CYLINDER	1E-72	626
1	EA	DOOR CLOSERS	4111 EDA	689
1	EA	WALL STOPS	WS407CVX	630
1	EA	PULLS	BF158	630
1	EA	KICK PLATES	K1050 8” X 1” LDW	630
3	EA	DOOR SILENCERS	SR64	GRY

HW SET: 16

DOOR NUMBERS:
141

EACH TO HAVE:

6	EA	HINGES	BB5000	652
1	EA	ENTRY LOCK	45H-7AB-14H	626
2	EA	DOOR CLOSER	4011	689
1	SET	SELF LATCHING FB	FB51P	626
1	EA	DUST PROOF STRIKE	DP-2	626
2	EA	FLOOR STOP	1211	626
1	EA	COORDINATOR	1700	600
2	EA	MAGNETIC HOLDERS	998	689
1	EA	ASTRAGAL	BY DOOR MFG	
4	EA	DOOR SILENCERS	SR64	GRY

HW SET: 16A

DOOR NUMBERS:
178

EACH TO HAVE:

6	EA	HINGES	BB5000	652
1	EA	ENTRY LOCK	45H-7AB-14H	626
2	EA	DOOR CLOSER	4011	689
1	SET	SELF LATCHING FB	FB51P	626
1	EA	DUST PROOF STRIKE	DP-2	626
2	EA	FLOOR STOP	1211	626
1	EA	COORDINATOR	1700	600
1	EA	ASTRAGAL	BY DOOR MFG	
4	EA	DOOR SILENCERS	SR64	GRY

HW SET: 17

DOOR NUMBERS:
143

EACH TO HAVE:

6	EA	HINGES	BB5000	652
1	EA	ENTRY LOCK	45H-7AB-14H	626
2	EA	DOOR CLOSER	4111 CUSH	689
1	SET	SELF LATCHING FB	FB51P	626
1	EA	DUST PROOF STRIKE	DP-2	626

1	EA	COORDINATOR	1700	600
1	EA	ASTRAGAL	BY DOOR MFG	
4	EA	DOOR SILENCERS	SR64	GRY

HW SET: 17A

DOOR NUMBERS:
192

EACH TO HAVE:

5	EA	HINGES	BB5000	652
1	EA	ELECTRIC HINGE	BB5060 ETW-6	652
1	EA	STOREROOM LOCK	45H-7D-14H	626
1	EA	ELECTRIC STRIKE	6223 X 24V	630
2	EA	DOOR CLOSER	4111 CUSH	689
1	SET	SELF LATCHING FB	FB51P	626
1	EA	DUST PROOF STRIKE	DP-2	626
1	EA	COORDINATOR	1700	600
1	EA	ASTRAGAL	BY DOOR MFG	
4	EA	DOOR SILENCERS	SR64	GRY
1	EA	POWER SUPPLY	PS861	

NOTE: ELECTRICAL CONNECTION REQUIRED

HW SET: 17B

DOOR NUMBERS:
214

EACH TO HAVE:

5	EA	HINGES	BB5000	652
1	EA	ELECTRIC HINGE	BB5060 ETW-6	652
1	EA	STOREROOM LOCK	45H-7D-14H	626
1	EA	ELECTRIC STRIKE	6223 X 24V	630
2	EA	DOOR CLOSER	4111 EDA	689
1	SET	SELF LATCHING FB	FB51P	626
1	EA	DUST PROOF STRIKE	DP-2	626
2	EA	WALL STOPS	WS407CVX	630
1	EA	COORDINATOR	1700	600
1	EA	ASTRAGAL	BY DOOR MFG	
4	EA	DOOR SILENCERS	SR64	GRY
1	EA	POWER SUPPLY	PS861	

NOTE: ELECTRICAL CONNECTION REQUIRED

HW SET: 18

DOOR NUMBERS:
144

EACH TO HAVE:

3	EA	HINGES	BB5000	652
1	EA	ENTRY LOCK	45H-7AB-14H	626
1	EA	DOOR CLOSER	4111 CUSH	689
3	EA	DOOR SILENCERS	SR64	GRY

HW SET: 19

DOOR NUMBERS:
155, 156, 157

EACH TO HAVE:

2	EA	CONTINUOUS HINGES	SL11-HD	628
2	EA	EXIT DEVICE	2203 X CA-03 X LBR	630
2	EA	RIM CYLINDER	1E-72	626
2	EA	DOOR CLOSERS	4111 EDA	689
2	EA	WALL STOPS	WS407CVX	630
2	EA	MAG HOLDERS	998	689
2	EA	PULLS	BF158	630
2	EA	KICK PLATES	K1050 8” X 1” LDW	630
4	EA	DOOR SILENCERS	SR64	GRY

NOTE: ELECTRICAL CONNECTION REQUIRED

HW SET: 20

DOOR NUMBERS:
165, 166

EACH TO HAVE:

3	EA	HINGES	BB5002	630
1	EA	INDICATOR PRIVACY	45H-0L-14H-VIN	626
1	EA	DOOR CLOSER	1461	689
1	EA	FLOOR STOP	1211	626
1	EA	KICK PLATE	K1050 8” X 2” LDW	630
3	EA	DOOR SILENCERS	SR64	GRY

HW SET: 21

DOOR NUMBERS:
188

EACH TO HAVE:

3	EA	HINGES	BB5000	652	
1	EA	STOREROOM LOCK		45H-7D-14H	626
1	EA	OVERHEAD STOP	454S	630	
3	EA	DOOR SILENCERS	SR64	GRY	

HW SET: 22

DOOR NUMBERS:
186, 187

EACH TO HAVE:

3	EA	HINGES	BB5004	652	
1	EA	LOCK L9482L 17A X SK1 X L11-000			630
2	EA	MORTISE CYLINDERS		1E-74	626
1	EA	OVERHEAD STOP	104S	630	
3	EA	DOOR SILENCERS	SR64	GRY	

HW SET: 23

DOOR NUMBERS:
177, 191

EACH TO HAVE:

3	EA	HINGES	BB5000	652	
1	EA	STOREROOM LOCK		45-7D-14H	626
1	EA	ELECTRIC STRIKE	6210 24V		
1	EA	DOOR CLOSER	4111 CUSH	689	
3	EA	DOOR SILENCERS	SR64	GRY	
1	EA	POWER SUPPLY	PS861		

NOTE: ELECTRICAL CONNECTION REQUIRED

HW SET: 24

DOOR NUMBERS:
71, 72, 73, 74, 75

EACH TO HAVE:

1	EA	CYLINDER OR PADLOCK AS REQUIRED			626

BALANCE OF HARDWARE BY DOOR MFG.

HW SET: 25

DOOR NUMBERS:
212

EACH TO HAVE:

6	EA	HINGES	BB5006	630	
2	EA	EXIT DEVICES	FL2201 X LBR	630	
2	EA	DOOR CLOSER	4111 EDA	689	
2	EA	WALL MAGNETS	998	689	
2	EA	KICK PLATES	K1050 10” X 1” LDW		630
4	EA	DOOR SILENCERS	SR64 GRY		

NOTE: ELECTRICAL CONNECTION REQUIRED

HW SET: 26

ALL EXISTING OPENINGS TO RECEIVE CYLINDERS KEYED TO NEW SYSTEM.

END OF SECTION

SECTION 08800 - GLAZING

PART 1 - GENERAL

1. SECTION INCLUDES

A. The required applications of glass and glazing include but are not necessarily limited to the following:

1. Glazing curtainwall construction (Section 08900).

2. Glazed exterior entrances (Section 08900).

3. Glazing interior doors and storefront.

4. Glazing interior partitions and miscellaneous interior glazing.

5. Aluminum Cashier window

B. Generally glass types required are as follows unless otherwise indicated on the Drawings:

1. Exterior: Insulated units, of 1/4" tinted exterior glass lite with Low-E coating on the no.2 side, 1/2" air space and interior lite of 9/16" thick laminated unit of 1/4" clear glass, .09" PVB interlayer and 1/4" clear glass. Heat strengthened each lite as required to meet wind loads and large missile requirements. 9/16" thick laminated unit of 1/4" tinted glass Low-E coating on 2 side, .09" PVB interlayer and 1/4" clear glass at exterior entrances.

2. Glass and framing meeting missile impact criteria per requirements of SBCCI SSTD- 12, and ASTM E1886 and E1996, meeting requirements of the Large Missile Test of ASTM E 1996 and wind loads specified in Section 08900.

3. Interior: 1/4" monolithic units, clear; tempered where safety glazing is required; wire glass where indicated at fire rated construction.

C. See Section 08900- for load requirements.

2. RELATED SECTIONS

A. Section 07900 - Joint Sealers: Sealant and back-up material.

B. Section 08112 - Steel Doors.

C. Section 08900 - Glazed Curtainwall.

3. REFERENCES

A. ANSI/ASTM E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

B. ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Used in Buildings.

C. ASTM C1036 - Flat Glass.

D. ASTM C1048 - Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.

E. ASTM E546 - Test Method For Frost Point of Sealed Insulating Glass Units.

F. ASTM E576 - Test Method For Dew/Frost Point of Sealed Insulating Glass Units in Vertical Position.

G. ASTM E773 - Test Method for Seal Durability of Sealed Insulating Glass Units.

H. ASTM E774 - Sealed Insulating Glass Units.

I. FGMA - Glazing Manual.

J. FGMA - Sealant Manual.

K. FS DD-G-45ID - Glass, Plate, Sheet, Figure (Flat, for Glazing, Mirrors and other Uses).

L. FS TT-C-00598 - Caulking Compound, Oil and Resin Base Type.

M. FS TT-S-001657 - Sealing Compound, Single Component, Butyl Rubber Based, Solvent Release Type.

N. FS TT-S-00227 - Sealing Compound, Rubber Base, Two Component.

O. FS TT-S-00230 - Sealing Compounds, Synthetic-Rubber Base, Single Component, Chemically Curing.

P. FS TT-S-01543 - Sealing Compound, Silicone Rubber Base.

Q. Laminators Safety Glass Association - Standards Manual.

R. SIGMA - Sealed Insulated Glass Manufacturers Association.

4. PERFORMANCE REQUIREMENTS

A. Provide glass and glazing that has been produced, fabricated and installed to withstand normal thermal movement, wind loading and impact loading (where applicable), without failure including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glass and glazing materials and other defects in the work.

B. Glass and glazing materials of this Section shall provide continuity of building enclosure.

1. To utilize the inner pane of multiple pane sealed units for the continuity of the air and vapor seal.

2. Maintain continuous air and vapor barrier throughout glazed assembly from glass pane to heel bead of glazing sealant.

C. Provide thickness and/or heat treatment of glass as required to meet the wind loads (pounds/square foot) specified in Section 08900 and large missile impact requirmeents, required in sections specifying the systems in which glass is included, but not less than 1/4" thick; based on wind loading duration of 60 seconds, maximum allowable breakage probability at initial occurrence of design load of 8 lites/1000 (design safety factor of 2.5), and 1 lite/thousand and at overhead glazing.

D. Limit glass deflection to 1/200 or flexure limit of glass, with full recovery of glazing materials, whichever is less.

5. SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data on Glass Types Specified: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.

C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.

D. Samples: Submit two (2) samples, 12 x 12 inch in size, illustrating glass units; also glass units incorporated in curtainwall sample.

E. Samples: Submit 12 inch long bead of glazing gaskets, color as selected.

F. Manufacturer's Installation Instructions: Indicate special precautions required.

G. Manufacturer's Certificate: Certify that sealed insulated glass, meet or exceed specified requirements.

6. QUALITY ASSURANCE

A. Perform Work in accordance with FGMA Glazing Manual, FGMA Sealant Manual, SIGMA and Laminators Safety Glass Association - Standards Manual for glazing installation methods.

1. Maintain one copy of each document on site.

B. Safety Glazing Standards: Where safety glass is indicated or required by authorities having jurisdiction, provide type of products indicated which comply with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for category II materials, dated January 6, 1977 (The Consumer Product Safety Commission), i.e. doors, sidelights, etc.

C. Insulating Glass Certification Program: Provide insulating glass units permanently marked either on spacers or at least one component pane of units with appropriate certification label or inspecting and testing organization indicated below:

1. Insulating Glass Certification Council (IGCC).

D. Single Source Responsibility for Glass: To ensure consistent quality of appearance and performance, provide materials produced by a single manufacturer or fabricator for each kind and condition of glass indicated and composed of primary glass obtained from a single source for each type an class required.

7. PRE-INSTALLATION CONFERENCE

A. Convene one week prior to commencing work of this Section; see Section 01200.

8. ENVIRONMENTAL REQUIREMENTS

A. Do not install glazing when ambient temperature is less than 50 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

9. FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop Drawings and as instructed by the manufacturer.

10. COORDINATION

A. Coordinate the work with glazing frames.

11. WARRANTY

A. Manufacturer's Warranty on Insulating Glass Products: Provide written warranty signed by manufacturer of insulating glass agreeing to furnish f.o.b. point of manufacturer, freight allowed to project site, within specified warranty period indicated below, replacements for those insulating glass units which develop manufacturing defects. Manufacturing defects are defined as failure of hermetic seal of air space (beyond that due to glass breakage) as evidenced by intrusion of dirt or moisture, internal condensation or fogging at temperature above 20°F (-29°C), and other visual indications of seal failure or performance.

1. Warranty Period: Manufacturer's standard but not less than 10 years after date of substantial completion.

B. Manufacturer's Warranty on Laminated Glass: Provide written warranty signed by manufacturer of laminated glass agreeing to furnish f.o.b. point of manufacture, freight allowed project site, within specified warranty period indicated below, laminated glass units which develop manufacturing defects. Manufacturing defects are defined as edge separation or delamination which materially obstructs vision through glass.

1. Warranty Period: Manufacturer's standard but not less than 5 years after date of substantial completion.

C. Manufacturer's Warranty on Coated (Reflective) Glass: Provide written warranty signed by manufacturer of coated glass agreeing to furnish f.o.b. point of manufacture, freight allowed project site, within specified warranty period indicated below, coated glass units which develop manufacturing defects. Manufacturing defects are defined herein, due to normal conditions and not due to handling or installation or cleaning practices contrary to glass manufacturer's published instructions.

1. Warranty Period: Manufacturer's standard but not less than 10 years after date of substantial completion.

PART 2 - PRODUCTS

12. GLASS PRODUCTS, GENERAL:

A. Primary Glass Standard: Provide primary glass which complies with ASTM C 1036 requirements, including those indicated by reference to type, class, quality, and, if applicable, form, finish, mesh and pattern.

B. Heat-Treated Glass Standard: Provide heat-treated glass which complies with ASTM C 1048 requirements, including those indicated by reference to kind, condition, type, quality, class, and, if applicable, form, finish, and pattern.

C. Sizes: Fabricate glass to sizes required for glazing openings indicated, with edge clearances and tolerances complying with recommendations of glass manufacturer. Provide thicknesses indicated or, if not otherwise indicated, as recommended by glass manufacturer for application and performance indicated.

13. PRIMARY GLASS PRODUCTS

A. Clear Float Glass: Type I, Class 1 (transparent), quality q3 (glazing select).

14. HEAT-TREATED PRODUCTS

A. Manufacturing Process: Manufacture heat-treated glass as follows:

1. Horizontal (roller hearth) process with minimal roll wave distortion parallel with bottom edge of glass as installed to eliminate tong marks.

2. Tempered glass shall be strengthened in bending to not less than 4.5 times annealed glass strength.

3. Heat-strengthened glass shall be strengthened in bending to not less than 2.0 times annealed glass strength.

B. Tolerances: Heat strengthened and tempered glass shall be examined by the glass manufacturer to detect and discard any lights which exceed the following tolerances: 1/16" bow in 2 feet; 1/8" bow in 5 feet; 1/4" bow in 10 feet; 3/8" bow in 15 feet. Where the strengthening process results in essentially parallel ripples or waves, the deviation from flatness at any peak shall not exceed .005 inch, and the difference between adjacent peaks shall not exceed .003 inch. Where bow tolerance and wave tolerance differ, the stricter requirement shall govern.

C. Clear Tempered Float Glass: Grade B (fully tempered), style I (uncoated surfaces), type 1 (float), quality q3 (glazing quality), class 1 (transparent).

D. Clear Heat-Strengthened Float Glass: Grade A (heat strengthened), style I (uncoated surfaces), type 1 (float), quality q3 (glazing select), class 1 (transparent).

15. LAMINATED GLASS

A. Plastic Interlayer: Provide glass fabricator's standard clear polyvinyl butyral interlayer for laminating sheet of glass, with a proven record of showing no tendency to bubble, discolor or lose physical or mechanical properties after laminating and installation, in colors and of thickness indicated.

1. Product: Subject to compliance with requirements, provide "Saflex" by Monsanto Co. or equal.

B. Laminating Process: Fabricate laminated glass using laminator's standard heat-plus-pressure process to produce glass free from foreign substance and air/glass pockets.

C. Laminated Safety Glass : Two sheets of glass laminated together with a 0.09" thick plastic interlayer and complying with requirements indicated below:

1. Exterior Sheet: 1/4" coated tintedglass.

2. Interior Sheet: 1/4" clear glass.

3. Overall Thickness: 9/16".

D. 9/16” thick clear laminated glass, with glass and framing meeting large missile impact criteria per requirements of SSTD-12, hurricane/impact resistance complying with 2006 IBC Code. Two sheets of glass laminated together with a minimum 0.09" thick plastic interlayer or thicker if required to meet SSTD-12 and ASTM E1886 and E1996.

16. SEALED INSULATING GLASS UNITS

A. Insulating Glass: Provide two (2) sheets of heat strengthened glass complying with ASTM E 774 as follows, and 1/2" dry air or gas-filled space with -20°F dew point, with Class A sealant-type edge construction to maintain a hermetic seal as certified by the Insulating Glass Certification Council (I.G.C.C.) with silicone secondary seal at structural silicone joints; fabricated to provide the following overall performance characteristics:

1. Exterior Sheet: 1/4" thick, Azuria (PPG) tinted glass with Low –E (Sputtered) placed on No. 2 surface; Solarban 70 (2) by PPG and Guardian-Sunguard SuperNeutral 62 Azuria

2. Interior Sheet: 9/16” thick laminated clear glass with .09" interlayer.

3. Heat-strengthen or temper components as required to meet performance herein specified

4. Performance: As follows:

a. Light transmission (visible): 48%

b. Light reflectance: 9%

c. Solar Heat Gain Coefficient: 0.23

d. Shading coefficient: 0.27

e. U-value (summer daytime): 0.26

f. U-value (winter daytime): 0.28

5. Edge Construction: Twin primary seals of polyisobutylene; tubular aluminum or galvanized steel spacer-bar frame with welded or soldered sealed corners, and filled with dessicant; and secondary seal outside of bar, bonded to both sheets of glass and bar, of polysulfide, silicone or hot-melt butyl elastomeric sealant (fabricator's option).

17. GLAZING ACCESSORIES

A. General: All glazing accessories shall be compatible with all sealants within the system and with sealant at edge of insulated glass units.

B. Setting Blocks: Neoprene, EPDM or Silicone as recommended by the glazing manufacturer, 80 - 90 Shore A durometer hardness, length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.

C. Spacers: Neoprene, EPDM or Silicone 50 - 60 Shore A durometer hardness, minimum 3 inch long x one-half the height of the glazing stop x thickness to suit application.

D. Edge Blocks: Neoprene, EPDM or Silicone extruded shape of size and hardness required to limit lateral movement (side-walking) of glass.

E. Butyl Rubber Glazing Tape: Partly-vulcanized, self-adhesive, non-staining, elastomeric butyl rubber tape, 98% solids, intended for 35% compression, no appreciable deterioration for 3000 hour test in Atlas Weathermeter.

18. GLAZING GASKETS

A. See Section 08900 for requirements for gaskets.

B. Dense Elastomeric Compression Seal Gaskets: Molded or extruded neoprene or EPDM gaskets of profile and hardness required to maintain watertight seal; complying with ASTM C 864, Option 1.

C. Cellular Elastomeric Preformed Gaskets: Extruded or molded closed cell, integral-skinned neoprene of profile and hardness required to maintain watertight seal; complying with ASTM C 509, Type II; black.

19. GLAZING SEALANT/COMPOUNDS

A. Provide exposed glazing materials of color selected by the Architect from manufacturer's standard colors. Provide hardness of materials as recommended by the manufacturer for the required application and condition of installation in each case. Provide only compounds which are proved to be fully

compatible with surfaces contacted.

B. Silicone Rubber Glazing Sealant: Silicone rubber, one-part elastomeric sealant, complying with FS TT-S-001543, Class A, high modulus silicone glazing compound, acid curing. One of the following:

1. Dow Corning 999; Dow Corning Corp.

2. SCS 1200; General Electric Co.

3. Proglaze; Tremco

20. STRUCTURAL SILICONE SEALANT

A. Structural Silicone Sealant: Type recommended by sealant and system manufacturers that complies with ASTM C 1184 requirements, is compatible with system components with which it comes in contact, and is specifically formulated and tested for use as a structural and weatherseal sealant as follows:

1. "Ultraglaze SSG 4000" by G.E.

2. "983 SSG" by Dow.

B. Color: As selected by Architect from manufacturer's full range of colors.

C. Tensile Strength: 100 psi (689.5 kPa) minimum.

D. Provide sealant with high modulus of elasticity that will not allow movement of more than 25 percent of joint width, unless less movement is required by structural-sealant-glazed systems' design.

21. CASHIER WINDOW

A. Basis of design: Equal to number SCW103N, manufactured by C.R. Laurence Co., Inc.

B. Frames: Aluminum cashier window frame to be 1.390” x .625” extruded aluminum. Overall frame size to be 30” W x 32”H (Includes 2” H stainless steel shelf.)

C. Finish: All aluminum to be clear anodized.

D. Glazing: ¼” Clear tempered Glass.

E. Shelf: Provide a shelf not less than 2” thick with recessed deal tray. The shelf is to be the full width of the window and 18” deep centered under the glazing.

F. Voice Transmission: Communication permitted by 834A no draft speak-thru centered in glazing.

PART 3 - EXECUTION

22. EXAMINATION

A. Verify that openings for glazing are correctly sized and within tolerance.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

23. PREPARATION

A. Pre-Installation Meeting: At Contractor's direction, Glazier, sealant and gasket manufacturers' technical representatives, glass framing erector and other trades whose work affects glass and glazing shall meet at project site to review procedures and time schedule proposed for glazing and coordination with other work.

B. Clean glazing channels and other framing members to receive glass, immediately before glazing. Remove coatings which are not firmly bonded to substrates. Remove lacquer from metal surfaces where elastomeric sealants are indicated for use.

24. GLAZING

A. Watertight and airtight installation of each piece of glass is required. Each installation must withstand normal temperature changes, wind loading, impact loading (for operating sash and doors) without failure of any kind including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glazing materials and other defects in the work.

B. Comply with "Glazing Manual" by Flat Glass Marketing Association except as shown and specified otherwise, and except as specifically recommend otherwise by the manufacturers of the glass and glazing materials.

1. Provide a minimum nominal glass bite of 1/2".

C. Comply with combined printed recommendations of glass manufacturers, of manufacturers of sealants, gaskets and other glazing materials, except where more stringent requirements are indicated, including those of referenced glazing standards.

D. Glazing channel dimensions as indicated in details are intended to provide for necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by job

conditions at time of installation.

E. Protect glass from edge damage during handling and installation; use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass with flares or bevels along one horizontal edge which would occur in vicinity of setting blocks so that these are located at top of opening. Remove from project and dispose of glass units with edge damage or other imperfections of kind that, when installed, weakens glass and impairs performance and appearance.

F. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

G. Install setting blocks of proper size in sill rabbet, located one quarter of glass width from each corner, but with edge nearest corner not closer than 6" from each corner, unless otherwise required. Set blocks in thin course of sealant which is acceptable for heel bead use.

H. Provide spacers inside and out, of correct size and spacing to preserve required face clearances, for glass sizes larger than 50 united inches (length plus height), except where gaskets or glazing tapes with continuous spacer rods are used for glazing. Provide 1/8" minimum bite of spacers on glass and use thickness equal to sealant width, except sealant tape use thickness slightly less than final compressed thickness of tape.

I. Provide edge blocking to comply with requirements of referenced glazing standard, except where otherwise required by glass unit manufacturer.

J. Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.

K. Structural Silicone Butt Glazing: Temporarily clamp glass during cure of structural silicone. After sufficient cure, remove clamps and fill any gaps in sealant. Mask glass and aluminum during application of silicone sealant. Remove masking immediately after tooling sealant.

L. Provide compressible filler rods or equivalent back-up material, as recommended by sealant and glass manufacturers, to prevent sealant from extruding into glass channel weep systems and from adhering to joints back surface as well as to control depth of sealant for optimum performance, unless otherwise indicated.

M. Where wedge-shaped gaskets are driven into one side of the channel to pressurize the gasket on the opposite side, provide adequate anchorage to ensure that gasket will not "walk" out when subjected to dynamic movement. Anchor gasket to stop with matching ribs, or by proven adhesives, including embedment of gasket tail in cured heel bead.

1. Miter cut and permanently bond gasket ends together by vulcanized process or silicone adhesive at corners so that gaskets will not pull away from the corners and result in voids or leaks in the glazing system.

25. MISCELLANEOUS INTERIOR GLAZING

A. Install glazing tape in accordance with manufacturer's instructions.

B. Cut glazing tape to length; install on glazing pane. Seal corners by butting spline and sealing junctions with manufacturer's recommended sealant.

C. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.

D. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.

E. Install removable stops without displacing glazing tape. Exert pressure for full continuous contact.

26. MANUFACTURER'S FIELD SERVICES

A. Glass product manufacturers to provide field surveillance of the installation of their products.

B. Monitor and report installation procedures, and unacceptable conditions.

27. CLEANING

A. Clean work under provisions of 01700.

B. Remove glazing materials from finish surfaces.

C. Remove labels after work is complete.

D. Clean glass and mirrors.

28. PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Section 01500.

B. After installation, mark pane with an 'X' by using removable plastic tape or paste.

END OF SECTION

SECTION 08900 - GLAZED ALUMINUM CURTAINWALL

PART 1 - GENERAL

1. SECTION INCLUDES

A. All curtainwall work with the major components to include, but not necessarily limited to the following for single-source responsibility, with the extent indicated on the Drawings. Curtainwall glazing system shall be custom design with structural silicone vertical butt joints, complying with profiles indicated on the drawings and performance specified herein

1. Exterior aluminum wall framing systems, (not including the building structure) to receive glass and other components, and all concealed secondary structural framing required to meet specified loads independent of building structure.

2. Sills and similar border and filler items that are integral with and extensions of the curtainwall system.

3. Glass and glazing for each component.

4. Sealants, caulking, joint fillers, and gaskets in conjunction with each component.

5. Anchors, inserts, support brackets, expansion devices, fasteners, flashings, vents, weeps, insulation, and similar elements in conjunction with each of the components hereof; support items also include those require embedding in other work, i.e. structure, requires coordination with other work.

6. Coatings in conjunction with curtainwall work, also including separation of all dissimilar materials.

7. Glass and framing meeting missile impact criteria per requirements of SBCCI SSTD-12, and ASTM E1886 and E1996, meeting requirements of the Large Missile Test of ASTM E 1996, with required silicone sealant glass installation.

8. Glazed exterior entrances including continuous hinges, exit devices and thresholds , as a part of this Section 08900, required to meet the loads specified equal to the quality specified in Section 08710, and remaining hardware specified in Section 08710

2. RELATED SECTIONS

A. Section 05500 - Metal Fabrications: Metal fabricated attachment devices and framed openings.

B. Section 07900 - Joint Sealers: System perimeter sealant and back-up materials.

C. Section 08410 – Interior Aluminum Entrances and Storefront.

D. Section 08800 - Glazing.

3. REFERENCES

A. AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.

B. AAMA - Curtain Wall Manual #10 - Care and Handling of Architectural Aluminum From Shop to Site.

C. AAMA 501 - Methods of Test for Metal Curtain Walls.

D. AAMA 605.2 - Specifications for High Performance Organic Coating on Architectural Extrusions and Panels.

E. AAMA SFM-1 - Aluminum Storefront and Entrance Manual.

F. ANSI/ASTM A36 - Structural Steel.

G. ANSI/ASTM A386 - Zinc Coating (Hot Dip) on Assembled Steel Products.

H. ANSI/ASTM A446 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.

I. ANSI/ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.

J. ANSI/ASTM B221 - Aluminum-Alloy Extruded Bar, Rod, Wire, Shape, and Tube.

K. ANSI/ASTM E283 - Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors.

L. ANSI/ASTM E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

M. ANSI/ASTM E331 - Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

N. SSPC - Steel Structures Painting Council.

4. PERFORMANCE REQUIREMENTS

A. Structural: Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall as

required by and calculated in accordance with the International Building Code 2006 and Supplements (City of New Orleans Building Code) and ASCE 7-02, measured in accordance with ANSI/ASTM E330 and when tested in accordance with ANSI/ASTM E330 as follows based on 130 mph wind speed; Importance Factor: 1.00, and Exposure B, and corners as defined in Code: The net design wind pressures below represent the net pressures (sum of internal and external) to be applied normal to each building surface.

1. Limit mullion deflection to flexure limit of glass or L/175, which ever is less, and in no case greater than 3/4".

2. No glass breakage, permanent damage to glazing, fasteners or anchors, and no permanent deformation to wall framing members shall occur at a structural test load equal to 1.5 times the specified positive and negative design wind pressure.

3. Deflection of members parallel to the plane of the wall, when carrying its full dead load, shall not exceed an amount that will reduce glass bite by less than 75 percent of the design dimension and shall not reduce edge clearance between itself and the panel, glass, or other fixed member immediately above or below to less than 1/8 inch.

B. Air Infiltration: Limit air leakage through assembly to 0.06 cfm/min/sq ft of wall area, measured at a reference differential pressure across assembly of 6.24 psf as measured in accordance with AAMA 501 or ANSI/ASTM E283.

C. Water Infiltration: No uncontrolled leakage when measured in accordance with AAMA 501 and ASTM E331 with a test pressure difference of 20% of design loads, but in no case less than 15 psf, with water rate of 5 gallons per hr. per sq. ft., nor any water leakage at a dynamic pressure at an air stream equivalent to the static pressure specified.

D. System shall accommodate, without damage to components or deterioration of seals, movement within system, movement between system and peripheral construction, dynamic loading and release of loads and deflection of structural support framing.

E. System to provide for expansion and contraction within system components caused by a cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental affect to system components.

F. Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by a weep drainage network within the framing system.

G. Design Requirements:

1. Metal stick framed systems with interior.

2. System manufacturer shall provide curtain wall systems, including necessary modifications to meet specified requirements and maintaining visual design concepts.

3. Fabricate glazing systems for exterior glazing at vision areas and exterior glazing at spandrel areas.

4. Perimeter conditions shall allow for installation tolerances, expansion and contraction of adjacent materials, and sealant manufacturer's recommended joint design.

5. Drawings are diagrammatic and do not purport to identify nor solve problems of thermal or structural movement, glazing, anchorage or moisture disposal.

6. Requirements shown by details are intended to establish basic dimension of unit, sight lines and profiles of members.

7. Do not assume glass, sealants and interior finishes contribute to framing member strength, stiffness or lateral stability.

8. Assemblies shall be free from rattles, wind whistles and noise due to thermal and structural movement and wind pressure.

9. Attachment considerations are to take into account site peculiarities and expansion and contraction movements so there is no possibility of loosening, weakening or fracturing connection between units and building structure or between units themselves.

10. Anchors, fasteners and braces shall be structurally stressed not more than 50% of allowable stress when maximum loads are applied

5. SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Indicate elevations and details with system dimensions, framed requirements and tolerances, affected related work and expansion and contraction joint location and details. Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, and internal drainage details.

C. Product Data: Provide data for each component of the assembly, including coatings and glass.

D. Samples: Submit two (2) samples 2 x 8 inches in size illustrating pre-finished aluminum surfaces and gaskets.

1. Full size sample of typical framing complete with glass and gaskets illustrating a corner and intersection condition.

E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements prepared and sealed by a registered Structural Engineer licensed in the State of the project, verifying the ability of members, assemblies, and connections to support the loads specified.

F. Test Reports: Provide test reports from a qualified independent testing laboratory that show compliance of the manufacturer's glazed aluminum curtain wall system with performance requirements indicated based on comprehensive testing of the system by the laboratory within the last three (3) years current production of the system by the Manufacturer.

6. QUALITY ASSURANCE

A. Perform Work in accordance with AAMA SFM-1 and AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.

B. Conform to requirements of ANSI A117.1.

C. Responsibility: The Drawings, showing the details of all items indicated herein, are for the sole purpose of defining the design intent and are intended to emphasize the profiles for this project. To avoid any misunderstanding or lack of interpretation, the Contractor is hereby advised that the responsibility for the curtain wall system, including all items listed under "Description of Work" herein, is totally his for single source responsibility, including the design, structural calculations, shop drawings, material installation, warranties, and related documentation and certification required herein.

7. QUALIFICATIONS

A. Manufacturer and Installer: Company specializing in manufacturing aluminum glazing systems with minimum five (5) years documented experience.

8. PRE-INSTALLATION CONFERENCE

A. Convene one week prior to commencing work of this Section; see Section 01200 - Project Meetings.

9. DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01600.

B. Handle work of this section in accordance with AAMA - Curtain Wall Manual #10.

C. Protect pre-finished aluminum surfaces with wrapping or stripable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

10. ENVIRONMENTAL REQUIREMENTS

A. Do not install sealants when ambient temperature is less than 40 degrees F during and 48 hours after installation.

11. FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

12. WARRANTY

A. General: All work included in this section shall be fully guaranteed for performance, materials, and workmanship for a period of no less than five (5) years from the date of Substantial Completion. Guarantees and warranties shall be delivered to the Owner in duplicate, in an acceptable form, executed by an authorized officer or manufacturer of each material and shall be dated and notarized by a duly authorized Notary Public. Any failure in any of the curtainwall components shall result in an extension of the guarantee period until the deficiency is permanently repaired.

1. The warranty shall agree to repair or replace defective materials and workmanship of the wall work during the warranty period. Defective materials and workmanship include abnormal deterioration, aging or weathering of the work, leakage of water or air exceeding specified limits, structural failure of components resulting from exposure to pressures and forces up to and including specified limits, failure of operating parts to function normally, deterioration or discoloration of finishes in excess of normal weathering and aging, glass breakage, secondary glass damage or breakage, failure of sealants and failure of the work to fulfill specified performance requirements.

B. Coating shall be warranted for ten (10) years against performance less than that specified herein.

PART 2 - PRODUCTS

13. MATERIALS

A. Extruded Aluminum: ANSI/ASTM B221; 6063 alloy, T5 temper for extruded structural framing members.

B. Sheet Aluminum: ANSI/ASTM B209; alloy and temper suitable for use.

C. Fasteners: Non-magnetic stainless steel or aluminum or other materials warranted by manufacturer to be non-corrosive and compatible with aluminum components. Provide nuts or washers of design having means to prevent disengagement; deforming of fastener threads is unacceptable

1. Do not use exposed fasteners.

2. Where fasteners anchor into aluminum less than 0.125" thick, provide non-corrosive pressed-in splined nuts or other type reinforcement to receive fastener threads.

D. Internal Reinforcing:

1. ASTM A 36 for carbon steel; or ASTM B 308 for structural aluminum.

2. Shapes and sizes to suit installation.

3. Shop coat steel components after fabrication with alkyd type zinc chromate primer complying with FS T-F-P-645.

E. Inserts and Anchorage Devices:

1. Manufacturer’s standard formed or fabricated assemblies, steel or aluminum, of shapes, plates, bars or tubes.

2. Shop coat steel assemblies after fabrication with alkyd type zinc chromate primer complying with FS TT-P-645.

F. Provide nuts or washers of design having means to prevent disengagement; deforming of fastener threads is unacceptable.

G. Secondary steel supports shall be structural shapes with G90 hot-dip galvanized

14. COMPONENTS

A. Frames: Provide framing systems fabricated from extruded aluminum members of size and profile indicated.

1. Mullion Configurations: Provide pockets at the inside glazing face to receive resilient elastomeric glazing and silicone to meet large missile requirements.. Mullions and horizontals shall be one piece. Make provisions to drain moisture accumulation to the exterior

B. Framing System Gaskets and Joint Fillers: Provide the wall manufacturer's standard permanent type framing system gaskets and joint fillers depending on joint movement and sealing requirements, such as sliding joints, compression joint translation, or non-moving joints.

C. Brackets and Reinforcements: Where feasible, provide the manufacturer's standard high-strength aluminum units; otherwise provide non-magnetic stainless steel. At the fabricator's option, brackets not exposed to weather or abrasion may be hot-dip galvanized steel complying with requirements of ASTM A 386. Provide non-staining, non-ferrous shims for installation and alignment of curtainwall work.

D. Concrete or Masonry Inserts: Provide cast iron, malleable iron or hot-dip galvanized steel inserts complying with requirements of ASTM A 386.

E. Entrance Door Frames: Provide tubular and channel frame entrance door frame assemblies, as indicated, with welded joints in accordance with manufacturer's standards. Reinforce as necessary to support required loads.

F. Stile-and-Rail Type Entrance Doors: Provide tubular frame members, fabricated with welded joints.

1. Glazing: Fabricate doors to facilitate replacement of glass or panels, without disassembly of stiles and rails. Provide snap-on extruded aluminum square glazing stops, with exterior stops anchored for nonremoval.

2. Design: Provide 1-3/4 inch thick doors of design indicated.

a. Medium stile (3-1/2 inch nominal width for top and vertical stiles and 6-1/2 inch wide bottom rail).

G. Weatherstripping: Where exterior door stiles or head rails do not close against fixed stops equipped with compression weatherstripping, provide sliding weatherstripping, retained in an adjustable strip in a mortise centered in the edge of the door.

H. Flashings: 0.0625 inch thick aluminum, finish to match mullion sections where exposed

15. GLASS AND GLAZING MATERIALS

A. Glass and Glazing Materials: As specified in Section 08800 of types described below:

1. Glass: glass specified in Section 08800.

B. Glazing Gaskets: Provide manufacturer's standard vulcanized corner pressure-glazing or wedge-lock dry glazing system of black resilient elastomeric glazing gaskets, setting blocks and shims or spacers as required; hardness as selected by the wall manufacturer.

1. Sponge gaskets extruded black neoprene w/40±5 durometer Shore A (ASTM D-509-70). Design to provide 20% to 35% compression with vulcanized corners.

2. Dense gaskets, extruded black neoprene w/70±5 durometer Shore A for hollow profiles and 60±5 for solid profiles (NAAMM SG-1=70) with vulcanized corners.

16. SEALANT MATERIALS

A. Sealant and Backing Materials: Comply with Section 07900 - Joint Sealers of Types described below.

1. Exterior Perimeter Sealant: Type A.

2. Interior Perimeter Sealant: Type B.

3. Sealant Used Within System (Not Used for Glazing): As recommended by curtainwall manufacturer equal to types recommended by sealant manufacturer to remain permanently elastic, tacky, non-drying, non-migrating and weathertight.

17. STRUCTURAL SILICONE SEALANT

A. Structural Silicone Sealant: Type recommended by sealant and system manufacturers that complies with ASTM C 1184 requirements, is compatible with system components with which it comes in contact, and is specifically formulated and tested for use as a structural and weatherseal sealant as follows:

1. "Ultraglaze SSG 4000" by G.E.

2. "983 SSG" by Dow.

B. Color: As selected by Architect from manufacturer's full range of colors.

C. Tensile Strength: 100 psi (689.5 kPa) minimum.

D. Provide sealant with high modulus of elasticity that will not allow movement of more than 25 percent of joint width, unless less movement is required by structural-sealant-glazed systems' design

18. FABRICATION

A. Provide thickness of framing members as necessary to comply with the structural loading requirements, but not less than the following:

1. Principal Extrusions: 0.125" min. thickness.

2. Principal Formed Sheet Members: .1875: min. thickness.

B. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

C. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.

D. Prepare components to receive anchor devices.

E. Arrange fasteners and attachments to conceal from view.

F. Prepare components with internal reinforcement for door hardware and door operator hinge hardware.

G. Reinforce framing members for imposed loads.

H. Where movement should be expected, provide slip-joint linings of sheets, pads, shims, or washers of fluorocarbon resin or a similar material recommended by the manufacturer.

I. Provide an individual-member erection system. Except for spandrel panels installed during erection, glazing shall be from inside.

19. HARDWARE

A. Hardware: Provide heavy-duty hardware units as indicated, scheduled, or required for operation of each door, including items of sizes, number, and "Premium" type recommended by manufacturer for service required and required and tested for specified loads and impact resistance performance with quality equal to that specified in Section 08710.

B. Glazed exterior entrances including continuous hinges (628 finish), exit devices (626 finish) and thresholds (626 finish), as a part of this Section 08900, required and tested to meet the loads specified, and remaining hardware specified in Section 08710.

20. FINISHES

A. General: All surfaces exposed to the exterior shall receive specified high performance fluoropolymer coating and specified acrylic enamel on interior surfaces.

B. Fluoropolymer Coating; Exterior Surfaces: High performance PVDF base color coating meeting AAMA 605.2 and containing thermocuring polyvinylidene fluoride (70% solids by weight) supplied under license by manufacturers listed below with minimum rated service life of 20 years as published by the

Manufacturer. Pre-treatment, epoxy primer, and finish coat(s) shall be factory baked-on of 1.0-1.5 dry mil thickness (minimum 0.2 dry mil primer and minimum 0.8 dry mil finish) with 2-3 coat system required for custom color

1. Color: As selected by the Architect

C. Polyvinylidene Fluoride (PVDF) Resin Manufacturers:

1. Hylar 5000™, Ausiomont USA, Inc.

2. Kynar 500®, Elf Atochem North America, Inc.

D. Coating Manufacturers: One of the following:

1. Akzo Chemical, Trinar

2. Lilly Co.,; Nubelar

3. Morton International; Fluoroceram

4. PPG Industries, Inc.; Duranar

5. Valspar Corp.; Fluropon

E. Performance Requirements: Provide applied coatings of color selected by the Architect that meet or exceed the criteria of AAMA 605.2 for the following tests using the test procedures specified in AAMA 605.2:

1. Color Uniformity.

2. Specular Gloss.

3. Dry Film Hardness.

4. Film Adhesion.

5. Impact Resistance.

6. Abrasion Resistance.

7. Chemical Resistance.

8. Corrosion Resistance.

9. Weathering.

10. Acid Resistance.

11. Chalking

F. Qualifications of Applicator: Licensed by the coating manufacturer. Use one applicator for all fluoropolymer coatings in the Project.

G. Apply one coat of bituminous paint to concealed aluminum and in contact with cementitious or dissimilar materials.

PART 3 - EXECUTION

21. EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify wall openings and adjoining materials are ready to receive work of this Section.

22. INSTALLATION

A. Install wall system in accordance with manufacturer's instructions and AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings at abutting construction; turn up flashing a minimum of 1/2" to form a concealed continuous pan with soldered/sealed watertight joints including rear and end dams.

G. Install glass in accordance with Section 08800, to glazing method required to achieve performance criteria.

H. Install perimeter sealant in accordance with Section 07900.

23. ERECTION TOLERANCES

A. Limit variations from plumb, level, or dimensioned angle to the following:

1. 1/8" maximum deviation in any 20' horizontal or vertical run.

2. 1/4" maximum deviation in any 40' run, any direction.

B. Limit variations from location (theoretical calculated positions in plan or elevation based on established floor lines and column lines), including variations from plumb and level, to the following:

1. 3/8" total maximum deviation from any member at any location.

2. 1/8" maximum change in deviation from any member for any 10' run, any direction.

C. Limit offset in the end-to-end and edge-to-edge alignments of adjoining and consecutive members, which form planes, continuous runs and profiles, to the following:

1. 1/16" maximum offset in any flush alignment, including any which are to be 1/2" or less out-of-flush, and including any which are separated 2" or less by reveal or protrusion in the plane of the wall.

2. 1/8" maximum offset in alignments which are to be out-of-flush by more than 1/2" or separated by a reveal or protrusion of more than 2" width.

D. 1/32" maximum offset between glass framing members at corners of glazing pockets.

24. ADJUSTING

A. Adjust work under provisions of Section 01700.

B. Adjust operating hardware and sash for smooth operation.

25. CLEANING

A. Clean work under provisions of 01700.

B. Remove protective material from pre-finished aluminum surfaces.

C. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

D. Remove excess sealant by method acceptable to sealant manufacturer.

26. PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Section 01500.

B. Protect finished Work from damage.

27. FIELD TESTS

A. Field water tests by static test method at 15 psf for 15 minutes in accordance with AAMA 501.2 latest edition and with latest updates as required to test glazing system and surrounding construction, shall be performed by the Contractor on completed portions of the curtainwall. In the event that such testing should result in any leakage, eliminate the causes of such leakage at no additional cost to the Owner. Remedial measures must maintain standards of quality and durability and are subject to review by the Architect. Provide powered scaffold, hose, and sufficient personnel to operate scaffold and hose.

1. Two successful water tests shall be conducted at the Architect's direction and at his selected areas. Unsuccessful water tests will not be counted a fulfillment of this requirement.

2. Procedures for evaluating the performance for resistance to water and air shall comply with AAMA 501.2

END OF SECTION

SECTION 09220 - PORTLAND CEMENT PLASTER

.

PART 1 - GENERAL

1. SECTION INCLUDES

A. Metal furring and lathing applied to metal stud/sheahing and also directly on masonry. Provide corrugated drainage mat at sheathing walls

B. Portland cement plaster system.

C. Finish: See schedule at end of section.

D. Soffits and walls.

E. Provide double stud backing at all control joints.

2. RELATED SECTIONS

A. Section 09260 - Gypsum Board Systems: Sheathing.

B. Section 05400 - Cold Formed Metal Framing: Structural metal studding and framing behind gypsum sheathing.

C. Section 07900 - Joint Sealers.

D. Section 07130 – Liquid applied air/vapor barrier

3. REFERENCES

A. ASTM C150 - Portland Cement.

B. ASTM C206 - Finishing Hydrated Lime.

C. ASTM C207 - Hydrated Lime for Masonry Purposes.

D. ASTM C897 - Aggregate for Job-Mixed Portland Cement Based Plasters.

E. ASTM C926 - Application of Portland Cement Based Plaster.

F. ASTM C1063 - Installation of Lathing and Furring for Portland Cement Based Plasters.

G. ASTM E119 - Methods for Fire Tests of Building Construction and Materials.

4. SYSTEM DESCRIPTION

A. Fabricate vertical elements to limit finish surface to 1/360 deflection under lateral point load of 100lbs in accordance to ASCE-7, current edition, based on 130 mph base wind load

B. Fabricate horizontal elements to limit finish surface to 1/360 deflection under superimposed dead load and wind uplift loads complying with International Building Code (2006) and ASCE-7, current edition, based on 130 mph base wind load

5. SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Provide data on plaster materials, characteristics and limitations of products specified.

C. Samples: Submit one sample, 12 x 12 inch in size illustrating finish color and texture.

6. QUALITY ASSURANCE

A. Perform Work in accordance with ASTM C926.

B. Maintain one copy of document on site.

7. QUALIFICATIONS

A. Applicator: Company specializing in performing the work of this section with minimum five years documented experience.

8. ENVIRONMENTAL REQUIREMENTS

A. Do not apply plaster when substrate or ambient air temperature is less than 50 degrees F nor more than 80 degrees F .

B. Maintain minimum ambient temperature of 50 degrees F. during installation of plaster and until cured.

PART 2 - PRODUCTS

9. PLASTER BASE MATERIALS

A. Cement: ASTM C150, Type I Portland.

B. Lime: ASTM C206, Type S; ASTM C207, Type S.

C. Aggregate: In accordance with ASTM C897.

D. Water: Clean, fresh, potable and free of mineral or organic matter which can affect plaster.

E. Plaster Mix Reinforcement: Glass fibers, chopped to 1/2 inch nominal length, alkali resistant.

10. PLASTER FINISH MATERIALS

A. Cement: As specified for plaster base coat, white color.

B. Lime: As specified for plaster base coat.

C. Water: Clean, fresh, potable and free of mineral or organic matter which can affect plaster.

11. FURRING AND SUSPENSION SYSTEM

A. Ceiling Hangers (Exterior): Size units in accordance with ASTM 1063.

B. Wire Ties: Soft galvanized steel wire. Either 16 gage or double 18 gage for support of furring and 18 gage for lathing and accessories.

C. Furring Brackets: One-piece metal assembly, with anchor plate and serrated bracket arm adjustable from 1/4" to 2-1/4", fabricated from 20 gage galvanized steel.

D. Rolled Steel Channels: Either hot-rolled or cold-rolled steel channels of the sizes indicated, with weights complying with ASTM 1063.

E. Screw-Type Furring Channels: Hat-shaped and special corner-shaped channels formed from 25 gage steel, with knurled faces to facilitate fastener penetration, complying with ASTM C645.

12. LATHING AND ACCESSORIES

A. Metal Lath: ASTM C847; galvanized, 3.4 lb/sq yd.; self furring at solid substrates (if any).

B. Casing Bead: Formed zinc; minimum 26 gage thick; depth governed by plaster thickness; maximum possible lengths; expanded metal flanges, with square edges.

C. Corner Bead: Formed zinc; minimum 26 gage thick; depth governed by plaster thickness; maximum possible lengths; expanded metal flanges, with square edges.

D. Base Screed: Formed zinc; minimum 26 gage thick; depth governed by plaster thickness; maximum possible lengths; expanded metal flanges, with square edges.

E. Corner Mesh: Formed zinc, minimum 26 gage thick; expanded flanges shaped to permit complete embedding in plaster; minimum 2 inches wide.

F. Control Joint Accessories: Formed zinc, minimum 26 gage thick; accordion profile, 2 inch expanded metal flanges each side.

G. Two-Piece Expansion Joint (Used at double stud joints): Formed zinc,26 gage thick, two-piece male/female joint unit, adjustable from 1/4" to 5/8".

H. Anchorage Methods: Screws, or other approved metal supports, of type and size to suit application, hot-dip galvanized to rigidly secure lath and associated metal accessories in place with multiple threads into the metal.

I. Drip Screed: See Drawings for model numbers.

J. Mat shall be equal to "MTI Sure Cavity" by Masonry Technology Inc

13. CEMENT PLASTER MIXES

A. General: Comply with ASTM C 926 for portland cement plaster base and finish coat mixes as applicable to plaster bases, materials, and other requirements indicated.

B. Portland Cement Plaster Base Coat Mixes and Compositions: Proportion materials and respective base coats in parts by volume for cementitious materials and in parts by volume per sum of cementitious materials for aggregates to comply with the following requirements for each method of application and plaster base indicated. Adjust mix proportions below within limits specified to attain workability.

1. Fiber Content: Add fiber to following mixes after ingredients have mixed at least 2 minutes. Comply with fiber manufacturer's directions but do not to exceed 2 lbs. per cu. ft. of cementitious materials. Reduce aggregate quantities accordingly to maintain workability.

C. Three-Coat Work Over Metal Lath: Base coats as indicated below:

1. Scratch Coat: 1 part portland cement, 0 to 3/4 parts lime, 2-1/2 to 4 parts sand.

2. Brown Coat: 1 part portland cement, 0 to 3/4 parts lime, 3 to 5 parts sand (approximately 1 bag of cement, 1/2 bag of lime and 4 cu. ft of sand).

D. Job-Mixed Portland Cement Plaster Finish Coats: Proportion materials for finish coats in parts by volume for cementitious materials and parts by volume per sum of cementitious materials for aggregates to comply with the following requirements:

1. 1 part portland cement, 3/4 to 1-1/2 parts lime, 3 parts sand (approximately 1 bag of cement, 1/2 bag of lime and 3 cu. ft of sand).

E. Mechanically mix cementitious and aggregate materials for plasters to comply with the applicable referenced application standard and with recommendations of plaster manufacturer. Mix materials in approved mechanical mixers of the type in which the quantity of water can be controlled accurately and uniformly, except that finish coats containing lime may be hand mixed. While the mixer is in continuous operation, add approximately 90 percent of the estimated quantity of water, half of the sand, all of the cementitious materials, and the other one-half of the sand shall be introduced into the mixture in that sequence and mix thoroughly with the remainder of the water until the mixture is uniform in color and consistency. Avoid excessive mixing or agitation. Discard plaster which has begun to set before it is used; retempering will not be permitted. Do not use frozen, caked, or lumped materials. Empth mixers and mixing boxes completely after each batch is mixed, and deep free of old plaster.

F. Mix only as much plaster as can be used prior to initial set.

G. Mix materials dry, to uniform color and consistency, before adding water.

H. Protect mixtures from freezing, frost, contamination, and evaporation.

I. Do not retemper mixes after initial set has occurred.

PART 3 - EXECUTION

14. EXAMINATION

A. Verify surfaces and site conditions.

15. INSTALLATION FURRING AND SUSPENSION SYSTEMS

A. Comply with ASTM 1063.

B. Isolation: Where metal furring and lathing abuts building structure horizontally or vertically, isolate the work to prevent the transfer of loading and structural movement into the furring and lathing, so that slip or cushion-type joints will absorb the deflections or movements.

C. Frame both sides of expansion and control joints with structural metal supports, and do not bridge the joint with runners, furring or lathing.

16. INSTALLATION - LATHING MATERIALS

A. Install 3/16 inch thick corrugated drainage mat on walls.

B. Attach metal lath through gypsum sheathing into metal supports using screws at maximum 6 inches on center.

17. INSTALLATION – ACCESSORIES

A. Continuously reinforce internal angles with corner mesh, return metal lath 3 inches from corner to form the angle reinforcement; fasten at perimeter edges only.

B. Place corner bead at external wall corners; fasten at outer edges of lath only.

C. Place strip mesh diagonally at corners of lathed openings. Secure rigidly in place.

D. Place 4 inch wide strips of metal lath centered over junctions of dissimilar backing materials. Secure rigidly in place.

E. Place casing beads at terminations of plaster finish. Butt and align ends. Secure rigidly in place.

F. Install frames plumb and level in opening. Secure rigidly in place.

G. Position to provide convenient access to concealed work requiring access.

H. Install zinc trim at locations to allow weeping of any entrapped moisture within the wall system.

18. CONTROL JOINTS

A. In addition to locations of joints indicated on the drawings for walls and soffits, or if not indicated, provide control joints and expansion joints at locations complying with the following criteria, approved by the Architect:

1. For exterior plaster, install control joints to create panels no larger than 144 square feet each panel, with no dimension exceeding 18 feet or exceeding a length-to-width ratio of 2 1/2 to 1, and above and below door and window openings. Provide two-piece expansion joints at all floor lines.

B. Establish control joints with specified joint device.

C. Coordinate joint placement with other related work.

D. Install backer rod and sealant at all joints in the field of the plaster and at joints at perimeter abutting other materials.

E. Seal the intersections of control joints with one or two part urethane sealant to provide watertight connections

F. Vertical control joints shall be installed uninterrupted with horizontal joints abutting the verticals.

19. PLASTERING

A. Apply plaster in accordance with ASTM C926.

B. Apply scratch coat to a nominal thickness of 1/2 inch, brown coat to a nominal thickness of 3/8 inch, and a finish coat to a nominal thickness of 1/8 inch over self-furring reinforcement.

C. Moist cure scratch and brown coats by keeping moist for at least 48 hours by applying a very fine fog spray at least twice daily. Apply brown coat immediately following initial set of scratch coat.

D. After curing, dampen base coat prior to applying finish coat.

E. Apply finish coat and work to a smooth and consistent finish.

F. Avoid excessive working of surface. Delay troweling as long as possible to avoid drawing excess fines to surface.

G. Moist cure finish coat for minimum period of 48 hours.

20. TOLERANCES

A. Maximum Variation from True Flatness: 1/8 inch in 10 feet .

21. SYSTEM/FINISH SCHEDULES

A. Exterior : Three coat cement plaster for sand float finish over self-furring metal lath.

END OF SECTION

SECTION 09260 - GYPSUM BOARD SYSTEMS

PART 1 - GENERAL

1. SECTION INCLUDES

A. Metal stud wall framing.

B. Metal channel ceiling framing.

C. Gypsum board.

D. Acoustical treatment.

E. Glass mat tile backer units at walls as base for tiled application.

F. Exterior wall sheathing with taped joints with liquid applied air/vapor barrier membrane (section 07130) covering all sheathing surfaces

G. Fire wall identification.

H. Drywall shaft system complete with metal framing, fire rated for 1 hour, 1" liner board and 5/8" gypsum board

I. Note: Gypsum board shall not be installed until building is watertight, including roof, and also the building systems are operable and the building is climatized..

2. RELATED SECTIONS

A. Section 06100 - Carpentry: Wood blocking.

B. Section 09900 - Painting: Surface finish.

3. REFERENCES

A. ASTM C36 - Gypsum Wallboard

B. ASTM C79 - Gypsum Sheathing Board

C. ASTM C442 - Gypsum Backing Board and Core Board

D. ASTM C645 - Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board.

E. ASTM C754 - Installation of Framing Members to Receive Screw Attached Gypsum Wallboard, Backing Board, or Water Resistant Backing Board.

F. ASTM C840 - Application and Finishing of Gypsum Board

G. ASTM C1002 - Steel Drill Screws for the Application of Gypsum Board

H. GA-201 - Gypsum Board for Walls and Ceilings

I. GA-216 - Recommended Specifications for the Application and Finishing of Gypsum Board

J. GA-600 - Fire Resistance Design Manual

4. SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Provide data on metal framing, gypsum board, profiled trim, and joint tape and compound.

5. QUALITY ASSURANCE

A. Perform Work in accordance with GA-216 and GA-600.

B. Maintain one copy of each document on site.

C. Single-Source Responsibility for Steel Framing: Obtain steel framing members for gypsum board assemblies from a single manufacturer.

D. Single-Source Responsibility for Panel and Finishing Products: Obtain each type of gypsum board and finishing panel products from a single manufacturer.

E. Provide type and gauge of framing to limit deflection to L/240 at 5 psf interior load with no change of indicated stud depth or spacing and height indicated on the Drawings.

6. QUALIFICATIONS

A. Applicator: Company specializing in performing the work of this section with minimum five (5) years documented experience.

7. REGULATORY REQUIREMENTS

A. Conform to applicable code for fire rated assemblies as follows:

1. Fire Resistance Ratings: As indicated by reference to GA File Numbers in GA-600 "Fire Resistance Design Manual" or to design designations in UL "Fire Resistance Directory" or in the listing of another testing and inspecting agency acceptable to authorities having jurisdiction.

2. All fire rated partitions shall be effectively and permanently identified with signs or stenciling in a manner acceptable to the authority having jurisdiction. Such identification shall be above any decorative ceiling and in concealed spaces stating "Fire and Smoke Barrier - Protect All Openings".

8. DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Neatly stack gypsum panels flat to prevent sagging.

C. Handle gypsum board to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal corner beads and trim.

9. PROJECT CONDITIONS

A. Environmental Conditions, General: Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C840 and with gypsum board manufacturer's recommendations.

B. Room Temperatures: For nonadhesive attachment of gypsum board to framing, maintain not less than 40°F (4°C). For adhesive attachment and finishing of gypsum board, maintain not less than 50°F (10°C) for 48 hours prior to application and continuously after until dry. Do not exceed 95°F (35°C) when using temporary heat sources.

C. Ventilation: Ventilate building spaces, as required, for drying joint treatment materials. Avoid drafts during hot dry weather to prevent finishing materials from drying too rapidly.

PART 2 - PRODUCTS

10. PARTITION AND WALL FRAMING MATERIALS

A. Steel Studs and Runners: G40 galvanized members, ASTM C645 and/or ATSM C754, with flange edges of studs bent back 90 degrees and doubled over to form 3/16-inch-wide minimum lip (return) and complying with the following requirements for minimum thickness of base (uncoated) metal and for depth:

1. Thickness: 25 gauge except 20 gauge at door jambs double studs) and at backing board applications.
2. Depth: As indicated.

3. Manufacturer: Member of the Steel Stud Manufacturers Association.

B. Fasteners for Metal Framing: Provide fasteners of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel framing and furring members securely to substrates involved; complying with the recommendations of gypsum board manufacturers for applications indicated and ASTM C514, C1002, and GA-216.

11. SUSPENDED AND FURRED CEILINGS FRAMING MATERIALS

A. General: Provide components complying with ASTM C754 for materials and sizes unless otherwise indicated.

B. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E1190 conducted by a qualified testing agency.

C. Wire for Hangers and Ties: ASTM A641, Class 1 zinc coating, soft temper.

D. Grid Suspension System for Interior Ceilings: ASTM C645, manufacturer's standard direct-hung grid suspension system composed of main beams and cross furring members that interlock to form a modular supporting network.

12. GYPSUM BOARD MATERIALS

A. Gypsum Board: ASTM C36; 5/8 inch thick, maximum permissible length; ends square cut, tapered edges; Type X all locations.

B. Tile Backer Units: Comply with ASTM C1178 Type X, of thickness and width indicated below, and in maximum lengths available to minimize end-to-end butt joints.

1. Thickness: 5/8 inch, unless otherwise indicated.

2. Width: Manufacturer's standard width but not less than 32 inches.

3. Manufacturer: Dense-Shield Fireguard Tile Backer by G-P Gypsum Co.

4. Joint Tape for Backer Units: Material recommended by backer unit manufacturer.

5. Joint Compound for Backer Unit: Material recommended by backer unit manufacturer

13. SHEATHING

A. Sheathing board for exterior walls shall be "DENS-GLASS GOLD" as manufactured by the Georgia-Pacific Corp., “SECUROCK” by USG, or “e2XP” Exterior Extended Exposure Sheathing by National Gypsum. Performance characteristics as follows:

1. Size: 5/8" thick, Type X, by 4'-0" by 9'-0" to 10'-0".

2. Composition: Gypsum sheathing board core in accordance with ASTM C1177 with fiberglass mattes both sides.

3. Fire resistance: One hour fire rating non combustible when tested in accordance with ASTM E136; when tested in accordance with ASTM E119.

B. Screws, metal framing: No. 6 Type S or S-12, bugle head, self-tapping, rust resistant.

C. Materials Warranty: Provide sheathing manufacturer's standard warranty covering sheathing materials for five years commencing on Date of Substantial Completion.

D. Weathering Warranty: Provide sheathing manufacturer's standard warranty covering in place exposure damage to sheathing for six months commencing on date of purchase by Contractor.

E. Joints: , Tape all joints with 20 mil thick self adhered membrane as part of the fluid applied waterproof/vapor barrier membrane

14. ACCESSORIES

A. Accessories for Interior Installation: Corner beads, edge trim and control joints complying with ASTM C1047 and shall be sheet steel coated with zinc by hot-dip or electrolytic processes.

B. Shapes indicated below by reference to Fig. 1 designations in ASTM C1047:

1. Cornerbead on outside corners, unless otherwise indicated.

2. LC-bead with both face and back flanges; face flange formed to receive joint compound. Use LC-beads for edge trim unless otherwise indicated.

3. L-bead with face flange only; face flange formed to receive joint compound. Use L-bead where indicated.

4. One-piece control joint formed with V-shaped slot, with removable strip covering slot opening.

5. Joint Materials: ASTM C475; GA 201 and GA 216; reinforcing tape, joint compound, adhesive and water.

C. Fasteners: ASTM C1002, Type S12, W and GA-216.

D. Sound Attenuation Blankets: Comply with ASTM C 665, Type 1and ASTM E 136; .70 pcf density, semi-rigid mineral glass blanket without membrane, Class 25 flame-spread, thickness indicated but not less than 3" for friction fit.

E. Acoustical Sealant: Manufacturer's standard complying with ASTM C834, non staining latex sealant.

15. EXAMINATION

A. Verify that site conditions are ready to receive work and opening dimensions are as instructed by the manufacturer.

16. METAL WALL FRAMING INSTALLATION

A. Install framing in accordance with ASTM C754 and C840, GA-201, GA-216, and GA-600.

B. Install supplementary framing, blocking, and bracing at terminations in gypsum board assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction. Comply with details indicated and with recommendations of gypsum board manufacturer or, if none available, with "Gypsum Construction Handbook" published by United States Gypsum Co.

C. Install runners (tracks) at floors, ceilings, and structural walls and columns where gypsum board stud assemblies abut other construction.

1. Where studs are installed directly against exterior walls, install asphalt felt strips between studs and wall.

D. Installation Tolerances: Install each steel framing and furring member so that fastening surfaces do not vary more than 1/8 inch from the plane formed by the faces of adjacent framing.

E. Install steel studs and furring in sizes and at spacings indicated, but not less than that required by the referenced steel framing installation standard, to comply with maximum deflection and minimum loading requirements specified.

F. Install steel studs so that flanges point in the same direction and so that leading edges or ends of each gypsum board can be attached to open (unsupported) edges of stud flanges first.

G. Frame door openings to comply with details indicated, with GA-219, and with applicable published recommendations of gypsum board manufacturer. Attached

vertical studs at jambs with screws either directly to frames or to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs. Use 20 gauge studs at openings.

H. Extend stud framing of partitions through the ceiling to the structure above where shown or indicated. Maintain clearance under structural building members to avoid deflection transfer to studs.

I. Blocking: Nail wood blocking to studs. Bolt or screw steel channels to studs. Install blocking for support of casework and countertops.

J. Where partition and wall framing abuts overhead structure.

1. Provide stud manufacturers standard slip type joints with double track at head, one secured to structure and other placed to slip within the track so no direct contact with structure will prevent any damage due to deflection and will also attain lateral support and avoid axial loading of the structure transferring to the parttition.

17. CEILING FRAMING INSTALLATION

A. Install in accordance with ASTM C754, GA201 and GA216.

B. Coordinate location of hangers with other work.

C. Install ceiling framing independent of walls, columns and above ceiling work. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

1. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

2. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.

3. Do not support ceilings directly from permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.

4. Do not connect or suspend steel framing from ducts, pipes or conduit.

D. Install suspended steel framing components in sizes and at spacings indicated but not less than that required by the referenced steel framing installation standard.

1. Wire Hangers: 0.1620 inch (8-gage) diameter, 4 feet o.c.

2. Main Runners: 1-1/2 inch, 4 feet o.c. with furring members at 16" o.c.

E. Installation Tolerances: Install steel framing components for suspended ceilings so that cross-furring members or grid suspension members are level to within 1/8 inch in 12 feet as measured both lengthwise on each member and transversely between parallel members.

F. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

G. Reinforce openings in ceiling suspension system which interrupt main carrying channels or furring channels, with lateral channel bracing. Extend bracing minimum 24 inches past each end of openings.

H. Laterally brace entire suspension system.

18. GYPSUM BOARD INSTALLATION

A. Install gypsum board in accordance with ASTM C840, GA-201, GA-216 and GA-600.

B. Install wall/partition board panels to minimize the number of abutting end joints or avoid them entirely. Stagger abutting end joints not less than one framing member in alternate courses of board. At stairwells and other high walls, install panels horizontally with end abutting joints over studs and staggered.

C. Install gypsum panels with face side out. Do not install imperfect, damaged, or damp panels. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

D. Locate both edge or end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Position adjoining panels so that tapered edges abut tapered edges, and field-cut edges abut field-cut edges and ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions. Avoid joints at corners of framed openings where possible.

E. Spot grout hollow metal door frames for solid core wood doors, hollow metal

doors, and doors over 32 inches wide. Apply spot grout at each jamb anchor clip and immediately insert gypsum panels into frames.

F. Double Layer Application: Secure both layers with screws. Place second layer perpendicular to first layer with joints offset from joints of first layer.

G. Use screws when fastening gypsum board to metal furring or framing.

H. Install edge trim where edge of gypsum panels would otherwise be exposed or semi-exposed. Provide edge trim type with face flange formed to receive joint compound except where other types are indicated.

1. Install LC-bead where gypsum panels are tightly abutted to other construction and back flange can be attached to framing or supporting substrate.

2. Install L-bead where edge trims can only be installed after gypsum panels are installed.

I. Place corner beads at external corners. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials.

J. Install control joints according to ASTM C840 and manufacturers recommendations, and in specific locations approved by the Architect for visual effect.

K. Ceramic Tile Base: At areas indicated for ceramic tile finish, install the following backing board. Apply horizontally with uncut edge at bottom or work, 1/4 inch above fixture lip. Seal cut edges of each piece with water resistant sealant before installation and seal around pipe penetrations and similar cut-outs in each sheet.

1. Tile backer units complying with manufacturers instructions and ANSI A108.11.

19. ACOUSTICAL TREATMENT

A. Provide the following as required and indicated at acoustically treated walls, i.e. sound blankets indicated, etc. Comply with ASTM C 919 and manufacturer's recommendations for locations of beads.

B. Seal perimeter of sound-rated work as follows:

1. At partitions, provide continuous beads of acoustical sealant at juncture of both faces of runners of plates with floor and ceiling construction, and wherever work abuts dissimilar materials. Seal prior to installation of gypsum boards. Fill voids with 1/4" minimum to 3/8" maximum round bead of sealant.

2. At ceilings, provide continuous beads of acoustical sealant wherever work abuts dissimilar materials or gypsum board partitions where indicated on the Drawings.

C. At control joints, provide continuous bead of sealant between edges of wall construction. Seal prior to installation of surface-applied control joint accessories and locate at proper depth in joint to allow for inserting of expansion portion of control joint accessory.

D. Provide double seal of multi-layer partition faces. Install face layer with 1/4" edge clearance at terminations of work, and install continuous bead of acoustical sealant all around.

E. At openings and cutouts, fill open spaces between edges of wall construction and fixtures, cabinets, ducts, and other flush or penetrating items and fill pack tightly with glass or mineral fiber insulation and seal with continuous bead of acoustical sealant.

F. Seal sides and backs of electrical boxes to completely close up openings and joints with a bead of acoustical sealant with maximum joint of 1/4" between drywall edge and box.

G. Sound Flanking Paths: Where sound-rated partitions intersect non-rated partitions and other rated partitions, extend sound-rated construction to completely close sound flanking paths through non-rated construction. Seal joints between face layers at vertical interior angles of intersecting partitions.

H. Ceiling Plenums: Where sound-rated partitions extend through non-sound rated ceilings to structural substrates above, extend the same treatment to that portion of the partition above the ceiling as specified for portion below the ceiling.

I. Partition Insulation: Install sound attenuation blankets, in partitions where indicated. Completely blanket space between studs to full height of partitions and friction fit snug against the wallboard with no gaps between blankets. Butt ends of blanket together. Fit carefully behind electrical outlets and other work which penetrate partitions for tight fit. Attach to back face of gypsum board in accordance with manufacturer's instructions.

J. Safing Insulation: Pack voids created by wall intersections at beams. Also use to seal the gap between the top of a partition and the slab to increase the sound transmission loss properties of partitions that are not constructed full height from floor to slab.

20. SHEATHING INSTALLATION

A. Install sheathing, where indicated on the drawings, in accordance with manufacturer's instructions and applicable instructions in GA-253 and ASTM

C1280

B. Install sheathing with gold side out. Tape all joints with permanent waterproof tape

C. Use maximum lengths possible to minimize number and of joints. Locate edge joints parallel to and located on framing. Stagger intermediate end joints of adjacent lengths of sheathing.

D. Metal Framing: Attach to metal framing with screws spaced 8" o.c. at perimeter and 8" o.c. along intermediate framing in field

1. Drive fasteners to bear tight against and flush with surface of sheathing. Do. not countersink.

2. Locate fasteners minimum 3/8" from edges and ends of sheathing panels or as otherwise recommended by the manufacturer. Seal fasteners with Dow Corning 795 or equal.

E. Caution: The exterior sheathing contains continuous filament fiberglass which can release during normal handling. Take precautions as recommended by the sheathing manufacturer.

F. Joint Tape: Permanent waterproof tape recommended by the sheathing and tape manufacturer for this application, compatible with the fluid applied waterproof/vapor barrier membrane

21. JOINT TREATMENTS

A. Tape, fill and sand joints, edges, and corners to produce specified surface finish, ready to receive finishes where indicated on the drawings, and as follows in accordance with ASTM C840 and GA-214:

1. Level 1: At ceiling plenum areas and concealed areas, embed tape at joints, unless a higher level finish is required for fire-resistant rated assemblies and sound-rated assemblies.

2. Level 2: At panels that are substrates for tile finish and acoustical tiles, embed tape and apply separate first coat of joint compound to tape, fasteners and trim flanges.

3. Level 3: Where indicated or required by indicated assembly, embed tape and apply separate first and fill coats of joint compound to tape, fasteners and trim flanges.

4. Level 4: Where panels are exposed to view including panels to receive wallcovering, embed tape and apply separate first, fill and finish coats of joint compound to tape, fasteners, accessories and trim flanges. Touch up

and sand between coats and after last coat as needed to produce a continuous smooth surface free of visual defects and ready to receive indicated finish.

5. Level 5: Where indicated on the drawings and/or specified herein, embed tape and apply separate first fill and finish coats of joint compound to tape, fasteners, accessories and trim flanges. Additionally, apply a thin, uniform skim coat of joint compound over entire surface. For skim coat, use finish coat joint compound or Tuff- Hide by U.S. Gypsum spray applied, for smooth finish with no evidence of substrate joints. Touch up and sand between coats and after last coat as needed to produce a continuous smooth surface free of visual defects and ready to receive indicated finish

6. At partition indicated with sound blankets and/or STC rating, tape and float all joints full height of partitions.

7. At exterior walls, tape and float all joints full height of wall whether receiving finishes or not.

B. Feather coats onto adjoining surfaces so that camber is maximum 1/32 inch.

22. FIRE WALL IDENTIFICATION

A. Provide a painted sign with minimum 4 inch letters of the following text: “Fire and Smoke Barrier - Protect All Openings.”

B. Provide at in attics above ceilings, and at attic level where ceilings do not exist, on fire walls shown on plans approximately 25 ft. on centers.

23. TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09300 - TILE WORK

PART 1 - GENERAL

1. SECTION INCLUDES

A. Tile floor, wall and base finish; as indicated on the drawings.

B. Thin set applications at floors and walls.

C. Showers: Thick set applications at shower bases with waterproofing/shower pan equal to Schluter Systems products and thinset walls on waterproof membrane complying with ANSI A118.10 equal to “KERDI” waterproof membrane by Schluter on cementitious backer board complting with ANSI A118.9 or ASTM C1325) or fiber cement underlayment complying with ASTM C1288.

D. Thresholds at door openings.

E. Sealing grout joints of all tile. Apply sealer to all stone surfaces and joints as follows:

1. Sealer: Low VOC “premium” grade clear sealer recommended specifically for indicated stone surfaces, equal to “Aqua Mix Sealers Choice Gold”. Indicated stone surfaces, equal to “Aqua Mix Sealers Choice Gold”.

2. Seal all stone surfaces with two (2) coats of sealer in strict accordance with sealer.

2. RELATED SECTIONS

A. Section 09260 - Gypsum Board Systems: Backer boards.

B. Division 15: Floor drains.

3. REFERENCES

A. ANSI/TCA A108.1 - Glazed Wall Tile, Ceramic Mosaic Tile, Quarry Tile and Paver Tile installed in Portland Cement Mortar.

B. ANSI/TCA A108.5 - Ceramic Tile Installed with Dry-Set Portland Cement Mortar or Latex Portland Cement Mortar.

C. ANSI/TCA A108.10 - Installation of Grout in Tilework.

D. ANSI/TCA A118.1 - Dry-Set Portland Cement Mortar.

E. ANSI/TCA A118.4 - Latex Portland Cement Mortar.

F. ANSI/TCA A118.7 – Polymer Modified Grouts

G. ANSI/TCA A137.1 - Specifications for Ceramic Tile.

H. TCA (Tile Council of America) - Handbook for Ceramic Tile Installation.

4. SUBMITTALS

A. Submit product data under provisions of Section 01300.

B. Submit product data indicating material specifications, characteristics, and instructions for using mortars and grouts.

1. Data shall also contain and be noted that the mortar and grout materials are recommended for the particular tile specified.

C. Submit samples under provisions of Section 01300.

D. Submit manufacturer's installation instructions under provisions of Section 01300.

E. Submit maintenance data under provisions of Section 01700.

F. Include recommended cleaning and stain removal methods, cleaning materials.

5. QUALITY ASSURANCE

A. Conform to ANSI/TCA A137.1

B. Conform to TCA Handbook for Ceramic Tile Installation.

C. Setting materials and grouts are based on products of Laticrete International, Inc., and establish the performance standards for the work of this section.

1. Products by W. R. Bonsal Co., Hydroment from Bostik and Mapei meeting the performance requirements are acceptable.

D. Comply with requirements of the American with Disabilities Act of 1990, Title III (Accessibility Regulations for Private Entities) and latest amendments (if any), where detectable warning surfaces are indicated on the Drawings.

6. QUALIFICATIONS

A. Manufacturer: Company specializing in the manufacture of products specified in this Section with minimum five years documented experience.

B. Installer: Company specializing in applying the work of this Section with minimum five years documented experience.

C. All setting and grout materials shall be by the same manufacturer for single source responsibility.

7. DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site under provisions of Section 01600.

B. Store and protect products under provisions of Section 01600.

C. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

8. ENVIRONMENTAL REQUIREMENTS

A. Do not install adhesives in a closed, unventilated environment.

B. Maintain 50 degrees F (10 degrees C) during installation of mortar materials.

PART 2 - PRODUCTS

9. TILE MATERIAL

A. Tile: ANSI/TCA A137.1, conforming to the following:

Size	See drawings
Edge	Cushioned
Surface Finish	See drawings
Color	See drawings
Coefficient of Friction	0.6 - 0.9 (dry) and 0.6 - 0.8 (wet)

B. Accessories and Base : tile with bull-nosed top edge (where tile is not the wall finish) and coved foot and coved internal vertical corners.

C. Colors: See drawings.

10. MORTAR MATERIALS

A. Setting Bed Mortar Materials: ANSI/TCA A108.1; Portland cement, sand and water.

B. Mortar Bond Coat Materials: ANSI/TCA A118.4; portland cement/sand or dry set mortar and latex additive equal to 211 Crete Filler Powder gauged with 4237 Latex Thinset Mortar Additive or 254 Platinum by Laticrete International, Inc.

11. GROUT MATERIALS

A. Cementitious Grout: Cementitious type with latex additive complying with requirements of ANSI 118.7 for polymer modified grouts, equal to products by Laticrete for application type and absorption rate of tile indicated and so indicated in the submittal Product Data and recommended for type of tile specified; unsanded at walls with joints less than 1/8 inch..

B. Sealant for Expansion Joints: Silicone sealant, moisture and bacteria resistant type, as specified in Section 07900.

12. ACCESSORIES

A. Thresholds: Marble type, color selected by the Architect, polished finish, full width of wall or frame opening, bevelled one side, radiused edges from bevel to vertical face, Group "A" hardness greater than 10.

13. MORTAR MIX AND GROUT MIX

A. Mix and proportion pre-mix setting bed and grout materials in accordance with manufacturer's instructions and indicated ANSI standards.

B. Machine Mixing: Mixer shall be a rotating blade type mortar mixer. Place liquid in mixer, start machine and add dry material. Mix only long enough to wet out the batch. DO NOT OVERMIX. Stop mixer and dump mortar from mixer promptly. Clean out mixer promptly with water.

C. Hand Mixing: Place liquid in clean container or mixing box, add dry material and mix. Adjust amount of liquid or dry material to obtain proper consistency.

PART 3 - EXECUTION

14. EXAMINATION

A. Verify that surfaces are ready to receive work. Examine substrates where tile will be installed for compliance with requirements for installation tolerances and other conditions effecting performance of installed tile.

B. Do not proceed with installation until unsatisfactory conditions have been corrected. Commencement of work signifies acceptance of substrate and installation conditions.

15. PREPARATION

A. Protect surrounding work from damage or disfiguration.

B. Vacuum clean existing substrate and damp clean.

C. Remove protrusions, bumps and ridges by grinding or chipping.

D. Repair, fill, and level cracks, holes, depressions and rough or chipped areas in substrate using patching material recommended by setting materials manufacturer. Level existing substrate surfaces to acceptable flatness tolerances.

16. INSTALLATION

A. Install mortar, tile, threshold and grout to comply with TCA Handbook for Ceramic Tile Installation Handbook Numbers as follows:

1. Tile Floors (thinset): TCA method F113 and F122 (with waterproof/crack isolation membrane at upper floors complyting with A108.17), latex-portland cement bond coat; ANSI A108.5 (tile) and ANSI A108.10 (grout).

2. Tile Walls (thinset): TCA method W245 (at backing board) with latex portland cement bond coat; ANSI A108.5 (tile) and ANSI A108.10 (grout).

3. Shower Stalls: TCA method B415 with thickset floor and thinset walls on tile backer board, and 16 oz..copper pan; ANSI A108.5 (tile) and ANSI A108.10 (grout). Showers: Thick set applications at shower bases with waterproofing/shower pan equal to Schluter Systems products and thinset walls on waterproof membrane complying with ANSI A118.10 equal to “KERDI” waterproof membrane by Schluter on cementitious backer board complting with ANSI A118.9 or ASTM C1325) or fiber cement underlayment complying with ASTM C1288

3. Expansion Joints: TCA method EJ171, Joint Design with two part urethane sealant and closed cell backing rod.

B. The setting bond coat mortar shall be applied with a notched trowel using a scraping motion to work the material into good contact with the surface to be covered. A trowel having notches approximately 1/4" x 3/8" is recommended for

pavers.

C. Only as much mortar shall be applied as can be covered within 10-20 minutes, or while surface is still tacky and wet. If "skinning" occurs, remove mortar and spread fresh material. Spread mortar with notches running in one direction that shall be perpendicular to the pressing, pushing and pulling of tile during placement When installing paver, a small quantity of the mortar shall be troweled or scraped onto the back of each piece. Pavers shall then be set in place and rapped or beaten with a small beating block to insure 100% full bedding and a true surface. Pavers shall be aligned to show uniform joints and then allowed to set until firm.

D. Excess mortar shall be cleaned from the surface of the pavers with a wet cloth or sponge while the mortar is fresh.

E. Terminate tile neatly at obstructions, edges, and corners, without disruption of pattern or joint alignment Place thresholds at exposed floor tile edges.

F. Cut and fit tile tight to penetrations through tile. Form corners and bases neatly. Align floor and base.

G. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight without voids, cracks, excess mortar, or excess grout.

H. Sound tile after setting. Replace hollow sounding units.

I. Keep expansion joints free of mortar or grout. Apply backer rods and sealant to joints in accordance with Section 07900.

J. Allow tile to set for a minimum of 48 hours prior to grouting.

K. Grout tile joints, packed full and free of all voids and pits. Apply grout to produce full, smooth grout joints of uniform width, and free of voids and gaps Clean excess mortar as works progresses

L. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

17. CLEANING

A. Clean work under provisions of 01700.

B. Clean tile surfaces. If one has been used, remove grout release and clean tile surfaces so they are free of grout residue and foreign matter, in accordance with manufacturer's instructions. If a grout haze or residue remains, use a

suitable grout haze remover or cleaner and contact grout manufacturer for recommendations. Flush surface with clean water before and after cleaning. Do not use harsh hydrochloric, muriatic or sulfuric acid or acid-based cleaners to clean glazed tiles or tiles grouted with latex modified grout

18. PROTECTION

A. Protect finished installation under provisions of Section 01500.

B. After cleaning, provide protective covering and maintain conditions to protect tile work from damage or deterioration. Where tiled surfaces will be subject to equipment or wheel traffic or heavy construction traffic, and during move-in of furniture and equipment, cover protective covering with 1/4" hardboard, plywood or similar material.

C. Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work

END OF SECTION

SECTION 09511 - SUSPENDED ACOUSTICAL CEILINGS

PART 1 - GENERAL

1. SECTION INCLUDES

A. Mineral fiber acoustical panels, reveal edge in suspended metal grid ceiling system and perimeter trim
B. Metal ceiling panels in suspended metal grid ceiling system and perimeter trim

2. RELATED SECTIONS

A. Division 15 : Air diffusion devices in ceiling system.

B. Division 16: Light fixtures in ceiling system.

3. REFERENCES

A. ASTM C635 - Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.

B. ASTM C636 - Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.

C. ASTM E1264 - Classification of Acoustical Ceiling Products.

D. Ceilings and Interior Systems Contractors Association CISCA - Acoustical Ceilings: Use and Practice.

E. UL - Fire Resistance Directory and Building Material Directory.

4. SYSTEM DESCRIPTION

A. Suspension system to rigidly secure acoustical ceiling system including integral mechanical and electrical components with maximum deflection of 1/360.

5. SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Indicate grid layout and related dimensioning, junctions with other work or ceiling finishes, interrelation of mechanical and electrical items related to system.

C. Product Data: Provide data on metal grid system components and acoustical units.

D. Samples: Submit two samples full size illustrating material and finish of acoustical units.

E. Samples: Submit two samples each, 12 inches long, of suspension system main runner, cross runner and edge trim.

F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

6. QUALIFICATIONS

A. Grid Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

B. Acoustical Unit Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

7. REGULATORY REQUIREMENTS

A. Conform to applicable code for fire rated assembly and combustibility requirements for materials.

8. ENVIRONMENTAL REQUIREMENTS

A. Maintain uniform temperature of minimum 60 degrees F, 16 degrees C, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

9. SEQUENCING

A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Install acoustical units after interior wet work is dry.

10. EXTRA MATERIALS

A. Furnish under provisions of Section 01700.

B. Provide 5 percent of total acoustical unit area of extra panels to Owner.

PART 2 - PRODUCTS

11. METAL SUSPENSION SYSTEM MATERIALS

A. Metal Suspension System Standard: Provide manufacturer's standard metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable ASTM C 635 requirements.

B. Finishes and Colors: Provide manufacturer's standard factory-applied finish for type of system indicated.

C. Attachment Devices: Size for 5 times the design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

1. Corrosion Protection: Carbon steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (0.005 mm) for Class SC service condition (mild).

D. Wire Hangers, Braces and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated Carbon Steel Wire: ASTM A 641 (ASTM A 641M), Class 1 zinc coating, soft temper.

2. Size: Select wire diameter so that its stress at 3 times the hanger design load (ASTM C 635, Table 1, Direct Hung) will be less than the yield stress of wire, but provide not less than 0.106 inch (2.69 mm) diameter wire.

E. Sheet Metal Edge Moldings and Trim: Type and profile indicated, or if not indicated, manufacturer's standard moldings for edges and penetrations that fit acoustical panel edge details and suspension systems indicated; formed from sheet metal of same material and finish as that used for exposed flanges of suspension system runners.

F. Steel Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from prepainted or electrolytic zinc-coated, cold-rolled steel sheet, with prefinished metal caps on flanges; other characteristics as follows:

1. Structural Classification: Intermediate-duty system.

2. End Condition of Cross Runners: Override (stepped) type.

3. Cap Material and Finish: Steel sheet painted white.

4. Face Width: 15/16".

G. Accessories: Stabilizer bars, clips, splices, edge moldings, hold down clips as required for suspended grid system.

H. Support Channels and Hangers: Galvanized steel; size and type to suit application, and ceiling system flatness requirement specified.

12. MANUFACTURERS - ACOUSTICAL UNITS

A. Acoustical Panels: ASTM E1264, Type 3, Form 2, Class 25 conforming to the following:

1. Size: 24 x 48 inches, scored to resemble 2 x 2.

2. Thickness: 3/4 inches.

3. Composition: Mineral.

4. Light Reflectance: .83 percent.

5. NRC Range: .50.

6. CAC Range: 35.

7. Surface Burring Characteristics: Class A.

8. Edge: Reveal.

9. Surface Color: White.

10. Surface Finish: equal to “Dune fine texture Second Look, tegular edge, HumiguardPlus” by Armstrong and approved equal by US Gypsum.

11. Warranty: 30 years with no visible sag at 104 degrees F/90% relative humidity and against mold/mildew and bacterial growth

13. ACCESSORIES

A. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 - EXECUTION

14. EXAMINATION

A. Verify that layout of hangers will not interfere with other work.

15. INSTALLATION - LAY-IN GRID SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C636 Intermediate Duty, manufacturer's instructions and as supplemented in this section.

B. Install system capable of supporting imposed loads to a deflection of 1/360 maximum.

1. Space hangers not more than 16" at end and 48" between each runner.

C. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.

D. Install after major above ceiling work is complete. Coordinate the location of hangers with other work.

E. Supply hangers or inserts for installation to Section with instructions for their correct placement.

F. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of the supporting structure or of the ceiling suspension system.

G. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

H. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three (3) tight turns. Connect hangers either directly to structures or to inserts, eye screws, or other devices that are secure, that are appropriate for substrate, and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.

I. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

J. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

K. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability. Support fixture loads by supplementary hangers located within 6 inches of each corner; or support components independently.

L. Do not eccentrically load system, or produce rotation of runners.

M. Install edge molding at intersection of ceiling and vertical surfaces, using longest practical lengths. Miter corners. Provide edge moldings at junctions with other interruptions.

1. Screw attach moldings to substrate at intervals not over 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3.18 mm in 3.66 m). Miter corners accurately and connect securely.

2. Do not use exposed fasteners, including pop rivets, on moldings and trim.

N. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

16. INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

1. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.

C. Install units after above ceiling work is complete.

D. Install acoustical units level, in uniform plane, and free from twist, warp and dents.

E. Cut panels to fit irregular grid and perimeter edge trim.

F. Coordinate insulation and other components as part of fire rated assembly.

17. ERECTION TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

SECTION 09540 - SUSPENDED METAL CEILINGS

PART 1- GENERAL

1. SECTION INCLUDES

A. One directional system suspension grid – custom color – smooth aluminum infill panels – 6’ curved components with a radius of 69”

2. REFERENCES

A. ASTM C635, Standard Specifications for Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.

B. ASTM C636, Recommended Practice for Installation of Metal Suspension System for Acoustical Tile and Lay-In Panels.

C. CISCA Ceiling Systems Installation Handbook.

D. High Recycled Content (HRC) – Classified as containing greater than fifty percent total recycled content. Total recycled content is based on product composition of post-consumer and pre-consumer (post-industrial) recycled content per FTC guidelines.

E. Related Sections include the following:

1. Division 9 – Section 09250 – Gypsum Board

2. Division 9 – Section 09511 – Acoustical Panel Ceilings

3. Division 15 Sections – Mechanical

4. Division 16 Sections – Electrical

3. SUBMITTALS

A. Samples: Submit data for suspension system main tees and cross tees, infill panels and if specified optional trim for review of finish color and appearance.

B. Shop drawings:

1. Contractor shall provide reflected ceiling plan and section through elevations: Submit ceiling suspension system layout to indicate ceiling modules.

2. Assembly drawings: Indicate module dimensions, accessory attachments, and installation of related components.

C. Manufacturer's data:

1. System details: Submit manufacturer's descriptive literature or standard drawings showing details of system with project conditions clearly identified, and manufacturer's recommended installation instructions.

2. Color chart: Submit manufacturer's standard color chart sample or match of color choice for approval.

4. DELIVERY, STORAGE, AND HANDLING

A. Delivery of materials: Deliver materials in original unopened packages, clearly labeled with manufacturer's name, item description, specification number, type, and class, as applicable.

B. Inspection: Promptly inspect delivered materials, file freight claims for damage during shipment, and/or replacement materials, as required.

C. Storage: Store in manner that will prevent warpage, scratches, or damage of any kind. Prevent interference to/by other trades and any other adverse job conditions due to storage locations or methods.

D. Handling: Handle in such a manner as to ensure against racking, distortion, or physical damage of any kind.

5. QUALITY ASSURANCE

A. Installer Qualifications: Installer shall have successful experience installing ceiling suspension systems.

B. Requirements of regulatory agencies: Codes and regulations of authorities having jurisdiction.

C. Mockups: Before installing 3-dimensional curved system, build mockups for each form of construction and finish required to verify selections made under sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Architect.

2. Notify Architect seven days in advance of dates and times when mockups will be constructed.

3. Demonstrate the proposed range of aesthetic effects and workmanship.

4. Obtain Architect's approval of mockups before starting suspended 3-dimensional system construction.

5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

6. Demolish and remove mockups when directed.

7. Approved mockups may become part of the completed work if undisturbed at time of Substantial Completion.

D. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

6. PROJECT CONDITIONS

A. Coordination with other work:

1. General: Coordinate with other work supported by or penetrating through the system.

2. Mechanical work: Ductwork above suspension system shall be complete, and permanent heating and cooling systems operating.

3. Electrical work: Installation of conduit above the CURVATURA system shall be complete before installation of suspension system.

B. Protection:

1. Personnel: Follow good safety and industrial hygiene practices during handling and installing of all products and systems, with personnel to take necessary precautions, and wear appropriate personal protective equipment as needed. Read material safety data sheets and related literature for important information on products before installation. Contractor to be solely responsible for all personal safety issues during and subsequent to installation; architect, specifier, owner and manufacturer will rely on contractor’s performance in such regard.

2. Existing Completed Work: Protect completed work above suspension system from damage during installation of CURVATURA system components.

7. EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Suspension system and infill material: Furnish quantity of full-size units equal to 10 percent of amount installed.

PART 2 – PRODUCTS

8. PRODUCTS AND MANUFACTURERS

A. Manufacturer: “CURVATURA 3-Dimensional Curved System” manufactured by USG Interiors, Inc., Chicago, Illinois U.S.A and American Decorative “The Wave” or equal by Armstrong and Gordon

B. Fabrication:

1. Main tees: Roll-formed, splice clip connection, cross tee holes and hanger wire holes at 12” from ends and 24” o.c.

2. Cross tees: Roll-formed, butt cut ends, high tensile steel end clinches to web section, double-locking and self-indexing design.

3. Finish: Manufacturer’s standard metal cleaning and finishing process to attain color selected.

4. Recycled Content:

a. Infill panels: High Recycled Content (HRC) not less than 90%.

b. Suspension systems and trim: Recycled Content not less than 25%

9. METAL SUSPENSION SYSTEMS

A. Metal Suspension System Standard: Provide ceiling manufacturer's standard metal suspension systems of materials and finishes indicated that comply with applicable ASTM C 635 requirements. Suspension members designed to support infill panels and trim.

B. Suspension system components:

1. General: Suspension system shall be CURVATURA Elite, 9/16” wide with 1/8” reveal, color of the suspension shall be custom color

2. Cross tees 2’ on center for two-directional system or stabilizer bars 4’ on center with 2’ cross tees at row ends when using one-directional system.

3. CURVATURA main tee curved segments

a. Vault tees (length of face of grid concave) 9/16” face with 5/32” reveal and 3/8” x 3/16” bulb, cross tee holes at 24” o.c., integral panel hold-down tabs and main tee splice plate.

b. Valley tees (length of face of grid convex) 9/16” face with 5/32” reveal and 3/8” x 3/16” bulb, cross tee holes at 24” o.c., integral panel hold-down tabs and main tee splice plate.

C. Infill:

1. infill panel types are as follows, unless otherwise indicated, custom color to be solid (non-metallic)

a. Solid aluminum

D. Accessories

1. Wall Attachment clips

2. Wall molding GWM9 12’ x 9/16” x 1-1/2” color to match suspension system

E. Trim : 2-1/4” high steel trim sections to match each main tee segment to provide a finished perimeter Trim color selected shall be custom.

PART 3 – EXECUTION

10. EXAMINATION

A. Examine substrates and structural framing to which suspended decorative channels attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage, and other conditions affecting performance of suspended decorative channels.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

11. PREPARATION

A. Coordination: Furnish layouts for cast-in-place anchors, clips, and other ceiling anchors whose installation is specified in other Sections.

B. Field dimensions must be verified prior to installation. Comply with layout shown on reflected ceiling plans.

12. INSTALLATION

A. Standard reference: Install in accordance with ASTM C636, CISCA installation standards, and other applicable code requirements.

B. Manufacturer's reference: Install in accordance with manufacturer's current printed recommendations.

C. Drawing reference: Install in accordance with approved shop drawings and locate ceiling in accordance with main tee dimensions relative to elevations.

D. Hanger wires:

1. Spacing: Space hanger wires on main tees at the alternate cross tee holes (maximum of 48" o.c.). Attach hangers directly to structure above as needed. Wires to hang plumb.

2. Limitations: Do not support wires from mechanical and/or electrical equipment, piping, or other equipment occurring above ceiling.

E. Accessories: Install accessories as applicable to meet the project requirements.

13. CLEANING

A. Suspension: Remove infill material and perform any necessary cleaning maintenance with nonsolvent-based commercial cleaner.

B. Immediately remove any corrosive substances or chemicals that would attack painted finishes (i.e., wallpaper adhesives).

C. Touch up all minor scratches and spots, as acceptable, or replace damaged sections when touchup is not permitted.

D. Painting: Repainting of suspension members shall be with a high-quality, solvent-based paint and applied as recommended by paint manufacturer.

E. Removal of debris: Remove all debris resulting from work of this section.

END OF SECTION

SECTION 09660 - RESILIENT TILE FLOORING AND BASE

PART 1 - GENERAL

1. SECTION INCLUDES

A. Resilient tile flooring.

B. Resilient base.

C. Resilient stair systems coverings.

2. REFERENCES

A. ASTM E84 - Surface Burning Characteristics of Building Materials.

B. FS SS-T-312 - Tile, Floor: Asphalt, Rubber, Vinyl, Vinyl Composition.

C. FS SS-W-40 - Wall Base: Rubber and Vinyl Plastic

3. REGULATORY REQUIREMENTS

A. Conform to applicable code for flame/fuel/smoke rating requirements and as follows:

1. Flame Spread: 25 or less per ASTM E89

2. Smoke Developed: 450 or less per ASTM E84

3. Smoke Density: 450 or less per ASTM E662

4. SUBMITTALS

A. Provide product data on specified products, describing physical and performance characteristics, sizes, patterns and colors available.

B. Submit samples under provisions of Section 01300

C. Submit two (2) tiles full size, illustrating color and pattern for each floor material specified.

D. Submit two (2) 3 inch long samples of base material for each color specified.

E. Submit manufacturer's installation instructions under provisions of Section 01300.

5. OWNERS EXTRA STOCK

A. Provide 5% of total area of specified tile and base in original cartons delivered to Owner for attic stock.

B. Deliver unused tile and base to Owner's attic stock, as directed by the Owner.

6. OPERATION AND MAINTENANCE DATA

A. Submit cleaning and maintenance data under provisions of Section 01700.

B. Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

7. ENVIRONMENTAL REQUIREMENT

A. Store materials for three days prior to installation in area of installation to achieve temperature stability.

B. Maintain ambient temperature required by adhesive manufacturer three days prior to, during, and 24 hours after installation of materials.

PART 2 - PRODUCTS

8. TILE FLOORING MATERIALS

A. Vinyl Composition Tile: ASTM F 1066-87, Class 2, Composition 1 (asbestos free); 12 x 12 inch size, $^{1}/_{8}$ inch thick with color and pattern throughout full thickness of tile.

1. See drawings for products.

2. Color selected by Architect.

B. Rubber Flooring: Flooring associated shall be 24" x 24" x 1/8" thick complying with ASTM F-1344, “Marbleized” and hammered texture-see drawings.

1. Composition: 100% synthetic virgin rubber, pigments, stablizing fillers, integral waxes and soil releasing agents.

9. BASE MATERIALS

A. Base: ASTM F 1066, Type TS Thermoset vulcanized 100% virgin synthetic rubber, 6 inch; full 1/8 inch thick; top set cove; ribbed back; matte finish of color selected by Architect.:

1. 120' coiled lengths for field formed corners.

B. Base Accessories: Same material, size, and color as base.

C. Manufacturers: Roppe Corp., Flexco, Johnsonite, Allstate by Stoler Industries and Burke Industries.

10. RESILIENT STAIR SYSTEM COVERINGS

A. Resilient Stair Treads: Provide treads where shown, consisting of single-piece units with integral nosing for width of stair treads, or equal-length units if tread width exceeds available manufactured lengths. Fill stair edge with epoxy filler to provide solid contact for tread nosing adhesion.

1. Provide rubber stair tread units complying with ASTM F-1344, Class 1, sanded backs, tapering thickness of 0.210" to .113" thickness, except 1/4" at nosing, raised round profile surface pattern

2. Nose Design: 2" tapered nose without riser, for visually impaired-solid color with 2" wide carborundum strip of contrasting color insert strip at the nose fo the tread..

3. Resilient Risers: Provide single-piece riser for height of 1/8" thick and width of stair risers or equal-sized units if riser width exceeds available manufactured lengths. Provide rubber risers for stairs, 1/8" ga. 7" cove to coordinate with treads.

4. Rubber Flooring at Landings: Flooring associated with stair system covering shall be 12" x 20" x 1/8" thick complying with ASTM F-1344, Class 1 with raised round profile surface pattern.
5. Composition: 100% synthetic virgin rubber, pigments, stablizing fillers, integral waxes and soil releasing agents..

11. ACCESSORIES

A. Subfloor Filler: White premix latex; type recommended by flooring materials manufacturer.

B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.

C. Resilient Edge Strips: 1/8" thick, homogeneous vinyl or rubber composition, tapered or bullnose edge, color to match flooring, or as selected by Architect from standard colors available; not less than 1" wide.

D. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 - EXECUTION

12. EXAMINATION

A. Verify that surfaces are smooth and flat with maximum variation of 1/8 inch in 10 ft. and are ready to receive Work.

B. Verify concrete floors are dry to a maximum moisture content of 7 percent, and exhibit negative alkalinity, carbonization, or dusting.

C. Beginning of installation means acceptance of existing substrate and site conditions.

13. PREPARATION

A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with subfloor filler.

B. Apply, trowel, and float filler to leave a smooth, flat, hard surface.

C. Prohibit traffic from area until filler is cured.

D. Vacuum clean substrate.

E. Apply primer if recommended by adhesive manufacturer.

14. INSTALLATION - TILE MATERIAL

A. Install in accordance with manufacturers printed instructions.

B. Mix tile from container to ensure shade variations are consistent.

C. Spread only enough adhesive to permit installation of materials before initial set.

D. Set flooring in place, press with heavy roller to attain full adhesion.

E. Lay flooring with joints and seams parallel to building lines to produce minimum number of seams.

F. Install tile to square grid pattern with all joints aligned. Allow minimum 1/2 full size tile width at room or area perimeter.

G. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.

H. Install edge strips at unprotected or exposed edges, and where flooring terminates. Fit joints tightly.

I. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

15. INSTALLATION - BASE MATERIAL

A. Apply resilient base to walls, columns, pilasters, casework and other permanent fixtures in rooms or areas where base is indicated.

B. Install base in as long lengths as practicable. Tightly bond base to backing throughout the length of each piece, with continuous contact at horizontal and vertical surfaces.

1. On Masonry surfaces, or other similar irregular surfaces, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.

C. Install inside and exterior preformed corners before installing straight pieces.

D. Form inside corners on job from straight pieces of maximum lengths possible by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce snug fit to substrate.

E. Field form all external corners by wrapping in strict accordance with manufacturer's printed instructions with minimum of 12" returns.

1. Form outside corners on job from straight pieces of maximum lengths possible by shaving or scoring the back of base at point where bending will occur. Remove a strip perpendicular to length of base and score only deep enough to produce a snug fit without removal of more than half the thickness of wall base.

F. Fit joints tight.

G. Install base on solid backing.

H. Scribe and fit to door frames and other interruptions.

I. Cut wallcovering as required to prevent base adherence to wallcovering surface.

J. Prohibit traffic on floor finish for 48 hours after installation.

16. CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean, seal, and wax floor and base surfaces in accordance with manufacturer's instructions.

END OF SECTION

SECTION 09665 - RESILIENT SHEET FLOORING AND INTEGRAL BASE

PART 1 - GENERAL

1. SECTION INCLUDES

A. Resilient sheet flooring, chemical resistant seamless application with integral 6 inch cove base.

2. REFERENCES

A. ANSI/ASTM E648 - Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.

B. FS L-F-475 - Floor Covering, Vinyl Surface (Tile and Roll), with Backing.

C. FS SS-T-312 - Tile, Floor: Asphalt, Rubber, Vinyl, Vinyl Composition.

3. REGULATORY REQUIREMENTS

A. Conform to applicable code for flame/fuel/smoke rating requirements in accordance with ASTM E84.

4. SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 01300.

B. Provide seaming plan.

C. Provide product data on specified products, describing physical and performance characteristics, sizes, patterns and colors available.

D. Submit samples under provisions of Section 01300.

E. Submit two samples 6 x 12 inches in size for sheet flooring, illustrating color and pattern for each floor material specified.

F. Submit manufacturer's installation instructions under provisions of Section 01300.

5. OPERATION AND MAINTENANCE DATA

A. Submit cleaning and maintenance data under provisions of Section 01700.

B. Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

6. ENVIRONMENTAL REQUIREMENTS

A. Store materials for three days prior to installation in area of installation to

achieve temperature stability.

B. Maintain ambient temperature required by adhesive manufacturer three days prior to, during, and 24 hours after installation of materials.

7. EXTRA MATERIALS

A. Provide 30 sq ft of flooring of each material specified under provisions of Section 01700.

PART 2 - PRODUCTS

8. SHEET FLOORING MATERIALS

A. Homogeneous Vinyl Sheet: FS L-F-475A (3), Type II, Grade A; chemical resistant, total thickness and wear layer of .080 inch, color and pattern through total thickness; sheet width of 72 inch, felt backing.

1. Approved: "Medintech" by Armstrong and "Gerflex K-Series" by Roppe.

9. ACCESSORIES

A. Subfloor Filler: White premix latex; type recommended by flooring material manufacturer.

B. Primers and Adhesives: Waterproof; types manufactured by flooring manufacturer.

C. Edge Strips: Resilient flooring material.

D. Welding Rods: Manufacturer's standard of color to blend with sheet vinyl.

E. Sealer: Provided by vinyl floor manufacturer.

PART 3 - EXECUTION

10. EXAMINATION

A. Verify that surfaces are smooth and flat with maximum variation of 1/8 inch in 10 ft, and are ready to receive Work.

B. Verify concrete floors are dry to a maximum moisture content of 7 percent, and exhibit negative alkalinity, carbonization, or dusting. Conduct manufacturer’s Bond and Moisture Test.

C. Beginning of installation means acceptance of existing substrate and site conditions.

11. PREPARATION

A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with subfloor filler.

B. Apply, trowel, and float filler to leave a smooth, flat, hard surface.

C. Prohibit traffic from area until filler is cured.

D. Vacuum clean substrate.

E. Apply primer to surfaces as recommended by flooring manufacturer.

12. INSTALLATION - SHEET MATERIAL

A. Install in accordance with manufacturer's printed instructions including welding rod at all seams.

B. Spread only enough adhesive to permit installation of materials before initial set.

C. Set flooring in place, press with heavy roller to attain full adhesion.

D. Lay flooring with joints and seams in accordance with seaming plan.

E. Install sheet flooring parallel to length of room. Provide minimum of 1/3 full roll width and double cut sheet.

F. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.

G. Install edge strips at unprotected or exposed edges, and where flooring terminates.

H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

13. PROTECTION

A. Prohibit traffic on floor finish for 48 hours after installation.

14. CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean floor in accordance with manufacturer's instructions including thoroughly stripping floor and application of two (2) coats of sealer.

END OF SECTION

SECTION 09670 – RESINOUS FLOORING

PART 1 GENERAL

1. SUMMARY

A. This Section includes the following resinous flooring systems:

a. Multi-colored troweled epoxy quartz mortar flooring system including integral cove base. Apply system over underlayment specified in Section 09672.

2. DEFINITIONS

A. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Engineer/Architect or Construction Manager.

B. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

C. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

D. Installer/Applicator/Erector: Entity engaged by Construction Manager as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

3. PERFORMANCE REQUIREMENTS

A. Chemical Resistance

1. Resinous flooring shall withstand repeated exposure to chemical agents used by the Owner in their facilities as listed in Division 1 Section “Chemical Resistance Requirements”.

2. Request from the Owner detailed information for these agents including concentration utilized and frequency of application for each.

3. Certify in writing to the Owner and Engineer/Architect that resinous flooring systems can resist repeated exposure to these agents.

4. SUBMITTALS

A. Product Data: For each type of product indicated. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required.

B. Shop Drawings

1. Provide floor plans, of scale matching Architectural Plans, which indicate extent of each different resinous flooring system including system type, color and pattern, degree of slip resistance, and dimensioned locations of control joints and seams where systems meet.

2. Provide enlarged details, at minimum 3 inch = 1 foot scale, indicating conditions at walls, door frames, pits, curbs, equipment pedestals, etc.

C. Samples for Initial Selection: For each type of exposed finish required.

D. Samples for Verification: For each resinous flooring system required, 6 inches square, applied to a rigid backing by Installer for this Project.

1. Include separate samples, matching size noted above, indicating manufacturer’s full range of slip resistance options.

E. Product Schedule: Use resinous flooring designations indicated in Part 2 and room designations indicated on Drawings in product schedule.

F. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.

G. References: Installer shall submit examples of not less than 5 projects of similar size and complexity. Include project name and location, products and square feet of flooring installed, date of completion, owner’s contact name and telephone number.

H. Certified Test Reports: Submit copies of test reports prepared by Owner’s Testing Agency indicating methods used and results observed for the following mandatory tests as well as any other tests performed:

1. Concrete substrate (floor slab) testing

2. Core sampling

3. Material sampling

4. Adhesion testing

I. Material Certificates: For each resinous flooring component, signed by manufacturer.

J. Maintenance Data: For resinous flooring to include in maintenance manuals.

K. Job Site File: Installer to organize and maintain the following in the construction office at the job site for turnover to the Owner at Substantial Completion:

1. Installation instructions

2. Preinstallation conference records

3. Work log

4. Environmental data log, including temperature and relative humidity beginning not less than 1 month before installation.

5. System component Material Safety Data Sheets (MSDS).

6. Test records from Owner's Testing Agency

5. QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer (applicator) who is experienced in applying resinous flooring systems similar in material, design, and extent to those indicated for this Project. Project Manager shall be a direct employee of resinous flooring manufacturer and shall oversee project scope and schedule in accordance .Resinous flooring manufacturer and installer shall have a record of successful in-service performance for specified resinous system(s) and scope.

1. Engage an installer who employs only persons trained and approved by resinous flooring manufacturer for applying resinous flooring systems indicated.

2. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.

3. Engage a project manager who is a direct employee of resinous flooring manufacturer.

B. Source Limitations: Obtain all resinous flooring materials, including grouts, resins, hardening agents, grouting coats, aggregates, topcoats, patching and fill material, joint sealant, and repair materials from a single ISO 9002 Manufacturer.

C. Preinstallation Conference: Prior to installation of flooring, meet at the Project site with the Manufacturer project manager, the Installer, the Engineer/Architect, the Owner's Representative and the Owner's Testing Agency. Record discussions and furnish copy to each participant.

1. Topics to be discussed shall include, but not be limited to:

a. Existing and new slab conditions

b. Owner’s Testing Agency results of mandatory testing

c. Surface preparation

d. Required room temperatures

e. Ventilation

f. Step-by-step application procedures

g. Curing time and methods

h. Protection of completed Work

D. Mandatory Testing:

1. ASTM E 1907 Standard Guide to Methods of Evaluating Moisture Conditions of Concrete Floors to Receive Resilient Floor Coverings

   a. ASTM F 1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride

   b. ASTM D 4263 Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method

   c. ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Slabs Using in situ Probes

2. ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring

3. ASTM D 4501 Standard Test Method for Shear Strength of Adhesive Bonds Between Rigid Substrates by the Block-Shear Method

E. Mockups: Apply mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Apply full-thickness mockups on 48-inch- square floor area selected by Engineer/Architect.

   a. Include 48-inch length of integral cove base.

2. Simulate finished lighting conditions for Engineer/Architect's review of mockups.

3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

6. QUALITY CONTROL

A. Owner will engage a qualified testing agency to perform testing services related to resinous flooring.

1. Owner will furnish Installer with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.

2. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.

3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Installer, and the Contract Sum will be adjusted by Change Order.

B. Owner's Testing Agency Responsibilities: Cooperate with Engineer/Architect, Construction Manager, and Installer in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Engineer/Architect, Construction Manager, and Installer promptly of irregularities or deficiencies observed in the Work during performance of its services.

2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.

3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.

4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service.

5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.

6. Do not perform any duties of Installer.

7. DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

B. Store materials to prevent deterioration from moisture, heat, cold, direct sunlight, or other detrimental effects.

8. PROJECT CONDITIONS

A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application including the following:

1. Maintain ambient air temperature between 60 and 86 deg F.

2. Type I Concrete substrate shall be properly cured for a minimum of 30 days. Type III Concrete shall be properly cured for a minimum of 7 days.

B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.

C. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application, unless manufacturer recommends a longer period.

D. Manufacturer shall furnish a single, written warranty covering 100% of the material and labor costs protecting the client from delamination, disbondment, and osmotic/hydrostatic failure for a period of three (3) years from date of installation.

PART 2 PRODUCTS

9. RESINOUS FLOORING SYSTEM

A. Multi-colored troweled epoxy quartz mortar flooring system. Basis-of Design Product: Equal to “Stonblend GSI” by Stonhard, Inc., 615-354-,4600General Polymers Ceram 100 and Dex O Tex Terracolor

B. System Characteristics:

1. Color: Custom colors tbd.

2. Wearing Surface: Smooth.

3. Integral Cove Base: 4-6 inches high with 1 inch radius.

4. Overall System Thickness: 3/16 inch

C. System Components: Manufacturer's standard components that are compatible with each other and as follows:

1. Primer: Type recommended by manufacturer for substrate and body coat(s) indicated.

2. Body Coat(s):

    a. Resin: Bisphenol A Epoxy troweled mortar with quartz aggregates.

    b. Application Method: Troweled.

3. Chemical-Resistant grout coat(s):

    a. Resin: 2 component clear UV resistant epoxy sealer.

    b. Resin: 2 component clear UV resistant leveling epoxy sealer.

4. UV-Resistant Topcoat:

    a. Basis-of Design Product: “Stonseal GS7” by Stonhard, Inc.

    b. Resin: Urethane.

    c. Type: Clear.

    d. Finish: Matte.

10. ACCESSORY MATERIALS

A. Patching and Fill Material: Resinous product of resinous flooring manufacturer.

B. Joint Sealant: Type produced by resinous flooring manufacturer for type of service and joint condition indicated.

1. Use sealants that have VOC content in compliance with current Ozone Transport Commission (OTC), state and local regulations.

PART 3 EXECUTION

11. PREPARATION

A. General: Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry, and neutral Ph substrate for resinous flooring application.

B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.

1. Roughen concrete substrates as follows:

a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup. Surface profile achieved shall be similar to medium grit sandpaper.

b. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written recommendations.

c. Verify that concrete substrates are dry. See “Testing of Floor Slabs” below.

12. FIELD QUALITY CONTROL

A. Testing and Monitoring Equipment Calibrations: Owner’s Testing Agency shall test and demonstrate to the Engineer/Architect, Installer and Owner’s Representative that calibrations on all testing and monitoring equipment are providing accurate readings.

B. Manufacturer’s Field Service

1. Manufacturer's Technical Service Representative: Manufacturer will send qualified technical representative to the Project site for the following purposes:

a. Coordinate schedule, environmental requirements, and pre-installation work with other trades.

b. Advise Installer’s personnel of procedures and precautions for use of flooring materials.

c. Attend moisture testing and all other testing procedures with the Engineer/Architect, the Owner’s Representative and the Installer in attendance.

d. Observe field mock-ups with the Engineer/Architect, the Owner’s Representative and the Installer in attendance.

e. Make periodic site visits and include record of observations by manufacturer’s technical representative in the applicators project documentation log.

f. Ascertain that each component of flooring system is being installed in accordance with manufacturer’s instructions.

g. Maintain a log of environmental conditions, work procedures, testing procedures, and protection measures to be included in job site file submittal.

C. Testing of Floor Slabs

1. Before installation of flooring, it is MANDATORY that Owner's Testing Agency test floor slabs for containment of moisture and moisture vapor emission, pH, and alkalinity levels that would be detrimental to adhesion of resinous flooring materials. ALL TESTS NOTED MUST BE COMPLETED.

2. Owner's Testing Agency to complete the following moisture tests as described below and as documented in ASTM E 1907.

    a. Testing of floor slabs for containment of moisture and moisture vapor emission shall be by calcium chloride test method in accordance with ASTM F 1869.

        1) For slabs on grade one test kit shall be placed for every 1000.sq. ft. of concrete slab area

        2) For elevated slabs one test kit shall be placed for every 5000 sq. ft. of concrete slab area

        3) Maximum transmission emission level for slabs on grade shall be 3 lbs of water per every 1000 sq ft. of floor slab area in 24 hour period.

        4) Maximum transmission emission level for elevated slabs shall be 3 lbs. of water per 5000 sq. ft. of floor slab area in 24 hour period.

        5) Protect against rewetting of concrete after testing.

        6) Coordinate environmental controls in advance and continuing for duration of flooring installation.

    b. Owner's Testing Agency to perform plastic sheet tests per ASTM D 4263.

    c. Owner's Testing Agency to perform relative humidity tests using probes per ASTM F 2170.

3. Owner's Testing Agency to perform pH tests per ASTM F 710.

4. Owner's Testing Agency to also perform additional moisture tests recommended by manufacturer with Owner's approval.

5. VERIFY THAT CONCRETE SUBSTRATES HAVE NEUTRAL PH AND THAT RESINOUS FLOORING WILL ADHERE TO THEM. IT IS MANDATORY THAT INSTALLER PROCEED WITH APPLICATION ONLY AFTER SUBSTRATES SUCCESSFULLY PASS TESTING LISTED ABOVE.

D. Testing Agency Activities During Resinous Flooring Application

1. Core Sampling: At the direction of Owner's Representative and at locations designated by Owner's Representative, Owner's Testing Agency to take 1 core sample per 92.9 sq.ft. resinous flooring, or portion of, to verify thickness. For each sample that fails to comply with requirements, take two additional samples. Installer to repair damage caused by coring and correct deficiencies.

2. Material Sampling: Owner's Representative may at any time and any number of times during resinous flooring application require the Owner's Testing Agency to collect material samples for testing for compliance with requirements.

    a. Material samples will be taken, identified, sealed, and certified in presence of Installer.

    b. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures in addition to testing procedures listed in manufacturer's product data.

3. Adhesion Test: Conduct "pull-off" tests on installed flooring in accordance with ASTM D 4501. Certify to the Engineer/Architect that results conform to the manufacturer's published maximum for adhesive strength before failure.

4. If test results show applied materials do not comply with specified requirements, Installer to pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply flooring materials to comply with requirements.

13. MATERIALS PREPARATION

A. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.

B. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.

C. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written recommendations.

14. APPLICATION

A. General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.

1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.

2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.

3. At substrate expansion and isolation joints, provide joint in resinous flooring to comply with resinous flooring manufacturer's written recommendations.

    a. Apply joint sealant to comply with manufacturer's written recommendations.

B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.

C. Apply waterproofing membrane, where indicated, in manufacturer's recommended thickness (Optional).

D. Apply moisture vapor emission barrier, in manufacturer's recommended thickness, and allow to cure for a minimum of 24 hours (Optional).

E. Apply troweled body coat(s) in thickness indicated for flooring system. Hand or power trowel and grout to fill voids. When cured, sand to remove trowel marks and roughness.

F. Apply grout coat, of type recommended by resinous flooring manufacturer to fill voids in surface of final body coat and to produce wearing surface indicated.

G. Apply chemical resistant coat(s) in number of coats indicated for flooring system and at spreading rates recommended in writing by manufacturer.

H. Apply UV resistant topcoat(s) in number of coats indicated for flooring system and at spreading rates recommended in writing by manufacturer.

I. Apply slip resistant texture approved by Owner.

15. CURING, CLEANING AND PROTECTION

A. Cure resinous flooring materials in compliance with manufacturer's directions, taking care to prevent their contamination during stages of application and prior to completion of curing process.

B. Remove excess resinous flooring material from surfaces it was not intended for and refinish those surfaces to original appearance as determined by the Engineer/Architect.

C. Protect resinous flooring from damage and wear during construction operation. Where temporary covering is required for this purpose comply with manufacturer's recommendations for protective materials and method of their application. Remove temporary covering just prior to cleaning for final inspection.

D. Clean resinous flooring just prior to final inspection. Use materials and procedures recommended by resinous flooring manufacturer.

END OF SECTION

SECTION 09672 – UNDERLAYMENT FOR RESINOUS FLOORING

PART 1 GENERAL

1. SUMMARY

A. This Section includes the following underlayment system for resinous flooring specified in Section 09670

1. Solid colored three component polymer osmotic pressure resistant grout.

2. DEFINITIONS

A. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Engineer/Architect or Construction Manager.

B. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

C. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

D. Installer/Applicator/Erector: Entity engaged by Construction Manager as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

3. PERFORMANCE REQUIREMENTS

A. Chemical Resistance

1. Resinous flooring shall withstand repeated exposure to chemical agents used by the Owner in their facilities as listed in Division 1 Section “Chemical Resistance Requirements”.

2. Request from the Owner detailed information for these agents including concentration utilized and frequency of application for each.

3. Certify in writing to the Owner and Engineer/Architect that resinous flooring systems can resist repeated exposure to these agents.

4. SUBMITTALS

A. Product Data: For each type of product indicated. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required.

B. Shop Drawings

1. Provide floor plans, of scale matching Architectural Plans, which indicate extent of each different resinous flooring system including system type, color and pattern, degree of slip resistance, and dimensioned locations of control joints and seams where systems meet.

2. Provide enlarged details, at minimum 3 inch = 1 foot scale, indicating conditions at walls, door frames, pits, curbs, equipment pedestals, etc.

C. Samples for Initial Selection: For each type of exposed finish required.

D. Samples for Verification: For each resinous flooring system required, 6 inches square, applied to a rigid backing by Installer for this Project.

1. Include separate samples, matching size noted above, indicating manufacturer's full range of slip resistance options.

E. Product Schedule: Use resinous flooring designations indicated in Part 2 and room designations indicated on Drawings in product schedule.

F. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.

G. References: Installer shall submit examples of not less than 3 moisture vapor barrier projects of similar size and complexity. Include project name and location, products and square feet of flooring installed, date of completion, owner's contact name and telephone number.

H. Certified Test Reports: Submit copies of test reports prepared by Owner's Testing Agency indicating methods used and results observed for the following mandatory tests as well as any other tests performed:

1. Concrete substrate (floor slab) testing

2. Core sampling

3. Material sampling

4. Adhesion testing

I. Material Certificates: For each resinous flooring component, signed by manufacturer.

J. Maintenance Data: For resinous flooring to include in maintenance manuals.

K. Job Site File: Installer to organize and maintain the following in the construction office at the job site for turnover to the Owner at Substantial Completion:

1. Installation instructions

2. Preinstallation conference records

3. Work log

4. Environmental data log, including temperature and relative humidity beginning not less than 1 month before installation.

5. System component Material Safety Data Sheets (MSDS).

6. Test records from Owner's Testing Agency

5. QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer (applicator) who is experienced in applying resinous flooring systems similar in material, design, and extent to those indicated for this Project. Project Manager shall be a direct employee of resinous flooring manufacturer and shall oversee project scope and schedule in accordance .Resinous flooring manufacturer and installer shall have a record of successful in-service performance for specified resinous system(s) and scope.

1. Engage an installer who employs only persons trained and approved by resinous flooring manufacturer for applying resinous flooring systems indicated.

2. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.

3. Engage a project manager who is a direct employee of resinous flooring manufacturer.

B. Source Limitations: Obtain all resinous flooring materials, including grouts, resins, hardening agents, grouting coats, aggregates, topcoats, patching and fill material, joint sealant, and repair materials from a single ISO 9002 Manufacturer.

C. Preinstallation Conference: Prior to installation of flooring, meet at the Project site with the Manufacturer project manager, the Installer, the Engineer/Architect, the Owner's Representative and the Owner's Testing Agency. Record discussions and furnish copy to each participant.

1. Topics to be discussed shall include, but not be limited to:

a. Existing and new slab conditions

b. Owner's Testing Agency results of mandatory testing

c. Surface preparation

d. Required room temperatures

e. Ventilation

f. Step-by-step application procedures

g. Curing time and methods

h. Protection of completed Work

D. Mandatory Testing:

1. ASTM E 1907 Standard Guide to Methods of Evaluating Moisture Conditions of Concrete Floors to Receive Resilient Floor Coverings

a. ASTM F 1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride

b. ASTM D 4263 Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method

c. ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Slabs Using in situ Probes

2. ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring

3. ASTM D 4501 Standard Test Method for Shear Strength of Adhesive Bonds Between Rigid Substrates by the Block-Shear Method

E. Mockups: Apply mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Apply full-thickness mockups on 48-inch- square floor area selected by Engineer/Architect.

a. Include 48-inch length of integral cove base.

2. Simulate finished lighting conditions for Engineer/Architect's review of mockups.

3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

6. QUALITY CONTROL

A. Owner will engage a qualified testing agency to perform testing services related to resinous flooring.

1. Owner will furnish Installer with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.

2. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.

3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Installer, and the Contract Sum will be adjusted by Change Order.

B. Owner's Testing Agency Responsibilities: Cooperate with Engineer/Architect, Construction Manager, and Installer in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Engineer/Architect, Construction Manager, and Installer promptly of irregularities or deficiencies observed in the Work during performance of its services.

2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.

3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.

4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service.

5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.

6. Do not perform any duties of Installer.

7. DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

B. Store materials to prevent deterioration from moisture, heat, cold, direct sunlight, or other detrimental effects.

8. PROJECT CONDITIONS

A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application including the following:

1. Maintain ambient air temperature between 60 and 86 deg F.

2. Type I Concrete substrate shall be properly cured for a minimum of 30 days. Type III Concrete shall be properly cured for a minimum of 7 days.

3. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.

4. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application, unless manufacturer recommends a longer period.

5. Manufacturer shall furnish a single, written warranty covering 100% of the material and labor costs protecting the client from delamination, disbondment, and osmotic/hydrostatic failure for a period of three (3) years from date of installation.

PART 2 PRODUCTS

9. RESINOUS FLOORING SYSTEM

A. Solid colored three component polymer osmotic pressure resistant grout.

1. Basis-of Design Product: Equal to “Stonfil OP2” by Stonhard, Inc., 615-354-4600

B. System Characteristics:

a. Color and Pattern: Solid

b. Wearing Surface: Smooth

c. Integral Cove Base: N/A

d. Overall System Thickness: 1/8” or 3mm

C. System Components: Manufacturer's standard components that are compatible with each other and as follows:

1. Primer: OP2 primer; squeegee applied.

2. Body Coat(s):

a. Resin: 3 component polymer OP2.

b. Application Method: rake; spike rolled.

10. ACCESSORY MATERIALS

A. Patching and Fill Material: Resinous product of resinous flooring manufacturer.

B. Joint Sealant: Type produced by resinous flooring manufacturer for type of service and joint condition indicated.

1. Use sealants that have VOC content in compliance with current Ozone Transport Commission (OTC), state and local regulations.

PART 3 EXECUTION

11. PREPARATION

A. General: Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry, and neutral Ph substrate for resinous flooring application.

B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.

1. Roughen concrete substrates as follows:

a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup. Surface profile achieved shall be similar to medium grit sandpaper.

2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written recommendations.

3. Verify that concrete substrates are dry. See “Testing of Floor Slabs” below.

12. FIELD QUALITY CONTROL

A. Testing and Monitoring Equipment Calibrations: Owner’s Testing Agency shall test and demonstrate to the Engineer/Architect, Installer and Owner’s Representative that calibrations on all testing and monitoring equipment are providing accurate readings.

B. Manufacturer’s Field Service

1. Manufacturer's Technical Service Representative: Manufacturer will send qualified technical representative to the Project site for the following purposes:

a. Coordinate schedule, environmental requirements, and pre-installation work with other trades.

b. Advise Installer's personnel of procedures and precautions for use of flooring materials.

c. Attend moisture testing and all other testing procedures with the Engineer/Architect, the Owner's Representative and the Installer in attendance.

d. Observe field mock-ups with the Engineer/Architect, the Owner's Representative and the Installer in attendance.

e. Make periodic site visits and include record of observations by manufacturer's technical representative in the applicators project documentation log.

f. Ascertain that each component of flooring system is being installed in accordance with manufacturer's instructions.

g. Maintain a log of environmental conditions, work procedures, testing procedures, and protection measures to be included in job site file submittal.

C. Testing of Floor Slabs

1. Before installation of flooring, it is MANDATORY that Owner's Testing Agency test floor slabs for containment of moisture and moisture vapor emission, pH, and alkalinity levels that would be detrimental to adhesion of resinous flooring materials. ALL TESTS NOTED BELOW AND IN ARTICLE 1.6, D ABOVE MUST BE COMPLETED.

2. Owner's Testing Agency to complete the following moisture tests as described below and as documented in ASTM E 1907.

a. Testing of floor slabs for containment of moisture and moisture vapor emission shall be by calcium chloride test method in accordance with ASTM F 1869.

1) For slabs on grade one test kit shall be placed for every 1000.sq. ft. of concrete slab area

2) For elevated slabs one test kit shall be placed for every 5000 sq. ft. of concrete slab area

3) Maximum transmission emission level for slabs on grade shall be 3 lbs of water per every 1000 sq ft. of floor slab area in 24 hour period.

4) Maximum transmission emission level for elevated slabs shall be 3 lbs. of water per 5000 sq. ft. of floor slab area in 24 hour period.

5) Protect against rewetting of concrete after testing.

6) Coordinate environmental controls in advance and continuing for duration of flooring installation.

b. Owner's Testing Agency to perform plastic sheet tests per ASTM D 4263.

c. Owner's Testing Agency to perform relative humidity tests using probes per ASTM F 2170.

3. Owner's Testing Agency to perform pH tests per ASTM F 710.

4. Owner's Testing Agency to also perform additional moisture tests recommended by manufacturer with Owner's approval.

5. Verify that concrete substrates have neutral Ph and that resinous flooring will adhere to them. IT IS MANDATORY THAT Installer proceed with application only after substrates SUCCESSFULLY pass testing listed above.

D. Testing Agency Activities During Resinous Flooring Application

1. Core Sampling: At the direction of Owner's Representative and at locations designated by Owner's Representative, Owner's Testing Agency to take 1 core sample per 92.9 sq.ft. resinous flooring, or portion of, to verify thickness. For each sample that fails to comply with requirements, take two additional samples. Installer to repair damage caused by coring and correct deficiencies.

2. Material Sampling: Owner's Representative may at any time and any number of times during resinous flooring application require the Owner's Testing Agency to collect material samples for testing for compliance with requirements.

a. Material samples will be taken, identified, sealed, and certified in presence of Installer.

b. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures in addition to testing procedures listed in manufacturer's product data.

c. Adhesion Test: Conduct "pull-off" tests on installed flooring in accordance with ASTM D 4501. Certify to the Engineer/Architect that results conform to the manufacturer's published maximum for adhesive strength before failure.

d. If test results show applied materials do not comply with specified requirements, Installer to pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply flooring materials to comply with requirements.

13. MATERIALS PREPARATION

A. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.

B. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.

C. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written recommendations.

14. APPLICATION

A. General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.

1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.

2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.

3. At substrate expansion and isolation joints, provide joint in resinous flooring to comply with resinous flooring manufacturer's written recommendations.

a. Apply joint sealant to comply with manufacturer's written recommendations.

B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.

C. Apply waterproofing membrane, where indicated, in manufacturer's recommended thickness (Optional).

D. Apply moisture vapor emission barrier, in manufacturer's recommended thickness, and allow to cure for a minimum of 24 hours (Optional).

E. Apply troweled body coat(s) in thickness indicated for flooring system. Hand or power trowel and grout to fill voids. When cured, sand to remove trowel marks and roughness.

F. Apply grout coat, of type recommended by resinous flooring manufacturer to fill voids in surface of final body coat and to produce wearing surface indicated.

G. Apply chemical resistant coat(s) in number of coats indicated for flooring system and at spreading rates recommended in writing by manufacturer.

H. Apply UV resistant topcoat(s) in number of coats indicated for flooring system and at spreading rates recommended in writing by manufacturer.

I. Apply slip resistant texture approved by Owner.

15. CURING, CLEANING AND PROTECTION

A. Cure resinous flooring materials in compliance with manufacturer's directions, taking care to prevent their contamination during stages of application and prior to completion of curing process.

B. Remove excess resinous flooring material from surfaces it was not intended for and refinish those surfaces to original appearance as determined by the Engineer/Architect.

C. Protect resinous flooring from damage and wear during construction operation. Where temporary covering is required for this purpose comply with manufacturer's recommendations for protective materials and method of their application. Remove temporary covering just prior to cleaning for final inspection.

D. Clean resinous flooring just prior to final inspection. Use materials and procedures recommended by resinous flooring manufacturer.

END OF SECTION

SECTION 09688 - CARPET

PART 1 - GENERAL

1. SECTION INCLUDES

A. Carpeting, broadloom and tiles, installed with glue-down installation method. Note: All carpet shall be laid out off-site for the required time to off-gas the carpet product prior to delivery to the site and installation.

B. Accessories.

2. SUBMITTALS

A. Submit manufacturer's installation instructions under provisions of Section 01300.

B. Submit seaming plan, method of joining seams, direction of carpet with the following criteria:

1. All carpet shall be laid in the same direction unless specifically shown otherwise.

2. Seams which occur at doorways and entries shall not be perpendicular to doors or entries. Seams occurring at doors and parallel to doors shall be centered directly under the door.

3. Seams occurring at corridor change of direction shall follow wall line parallel to carpet direction.

C. Provide product data on specified products, describing physical characteristics; sizes, patterns, colors available, adhesive with written recommendation from the carpet manufacturer, MSDS sheets on adhesive, and method of installation.

D. Submit samples under provisions of Section 01300.

E. Submit two (2) samples 24 x 24 inch in size illustrating color and pattern for each carpet material specified.

F. Submit manufacturer's installation instructions under provisions of Section 01300.

3. OPERATION AND MAINTENANCE MANUAL

A. Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning and shampooing.

4. EXTRA MATERIALS

A. Overrun Stock: Deliver overrun stock and scraps of unused carpet to Owner's attic stock, as directed by the Owner, in accordance with specified requirements.

1. Provide 3% of total area of each type of carpet delivered to Owner for attic stock.

5. QUALITY ASSURANCE

A. Warranty: Submit manufacturer's warranty to provide replacement of carpet if performance is less than the following for lifetime period from the installation:

1. Wear: No more than 10 % face yarn loss by weight in normal use.

2. Electrostatic Propensity (AATC-134-75) - 3.0 kv or less

3. No staining

B. Installer: Company with three years minimum documented experience.

6. REGULATORY REQUIREMENTS

A. Conform to applicable code for carpet flammability requirements.

B. Conform to ANSI/ASTM E648.

7. ENVIRONMENTAL REQUIREMENTS

A. Store materials for three days prior to installation in area of installation to achieve temperature stability.

B. Maintain minimum 70 degrees F ambient temperature three days prior to, during, and 24 hours after installation of materials.

PART 2 - PRODUCTS

8. MATERIALS

A. Carpet: See Drawings and as follows:

Flammability: Passes
DOC-FF-1-70 Pill Test:

NBS Smoke Chamber NFPA-258: Less than 450 Flaming Mode

9. ACCESSORIES

A. Sub-Floor Filler: Cementitious type equal to Dependable Chemical Company, Inc.

B. Primers and Adhesives: Waterproof "premium quality" type recommended in writing by carpet manufacturer.

1. Water based adhesive that complies with environmental standards for VOC content and fume emission with strength and performance equal to "premium" solvent based adhesives.

2. Releasable Adhesive: Low VOC adhesive as recommended by carpet manufacturer for direct glue down of modular tiles; comply with CRI Green Label Certification Program

C. Edge Strips: Roppe Rubber Model 38, rubber, color as selected.

PART 3 - EXECUTION

10. EXAMINATION

A. Verify that substrate surfaces are smooth and flat with maximum variation of 1/8 inch in 10 ft. and are ready to receive work.

B. Beginning of installation means acceptance of existing substrate and site conditions.

11. PREPARATION

A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with sub-floor filler.

B. Apply, trowel, and float filler to leave smooth, flat, hard surface at unusual depressions and at edges of marble flooring where feathering is required.

C. Prohibit traffic until filler is cured.

D. Vacuum floor surface.

E. Apply latex filler (flash-patch) at gouges in the concrete slab and at all changes in flooring from carpet to any other finishes so as to bring the top of the carpet up to the top of the other finish. Slope shall be feathered out as much as possible. Fill, level and make smooth cracks 1/16 inch or more, holes, unevenness, and roughness with compatible latex floor patching compounds. Feather floor filling or leveling compound a minimum of four (4) ft. Sweep floor of loose granular debris prior to filling. After filling, allow filler to dry. Damp mop floor with warm water and allow to dry. Vacuum after mopping to ensure that loose granular debris is removed and to provide a proper substrate to install Modular carpet. Prohibit traffic until filler is cured.

12. INSTALLATION

A. Install carpet over entire area to be carpeted.

B. Apply carpet and adhesive in accordance with manufacturer's printed instructions using the glue down method. Carpet seams and edges shall be tightly attached, eliminate air pockets, and roll to ensure uniform bond everywhere.

1. Installed carpet tiles shall not set in adhesive to cause a permanent bond.

C. Lay out rolls of carpet.

D. Verify carpet match before cutting to ensure minimal variation between dye lots.

E. Double cut carpet, to allow intended seam and pattern match. Make cuts straight, true and unfrayed.

F. Locate seams to minimize the number of seams and in area of least traffic; individual offices shall not have seams.

G. Fit seams straight, not crowded or peaked, free of gaps.

H. Lay carpet on floors with run of pile in same direction as anticipated traffic.

I. Do not change run of pile in any room where carpet is continuous through a wall opening into another room. Locate change of color or pattern between rooms under door centerline.

J. Cut and fit carpet around interruptions.

K. Fit carpet tight to intersection with vertical surfaces without gaps

L. Conceal cut edges with protective edge guards or flanges. Install edging guards at openings and doors wherever modular carpet terminates, unless indicated otherwise Install edge strip secured adhered to floor.

13. CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage. Remove any spots or smears of adhesive from carpet and other surfaces with an approved cleaning agent

B. Clean and vacuum carpet surfaces with commercial beater type vacuum.

C. Remove any protruding face yarns with a sharp scissors

14. PROTECTION

A. Prohibit traffic from carpet areas 24 hours after installation.

END OF SECTION

SECTION 09690 - WATER VAPOR EMISSION CONTROL SYSTEMS

PART 1 – GENERAL

1. RELATED DOCUMENTS

A. Drawings, documents, and general provisions of the Contract, including, but not necessarily limited to, General Conditions and Division 1 Specification Sections, apply to this Section.

B. Related Sections- Coordinate work of this Section with work of other Sections to properly execute the work requirements and maintain satisfactory progress of work in other Sections.

1. Section 03300: Cast-In Place Concrete Installation and curing requirements according to ACI 302.

2. Section 09640: Wood Flooring, Installation requirement.

3. Section 09660: Resilient Flooring, rubber sheet and vinyl tile installation requirements.

4. Section 09670: Fluid Applied Flooring, Installation requirements.

5. Section 09688: Carpet, Installation requirements.

2. SUMMARY

A. This Section includes the furnishing, testing, and application of systems for the reduction of moisture vapor transmission and alkalinity control for all Interior concrete slabs requiring the installation of VCT, vinyl flooring, rubber flooring, carpet, and/or epoxy flooring systems.

3. SUBMITTALS

A. General: Submit each item in this Article according to the, requirements and Conditions of the Contract in Division 1. Specification Sections.

B. Product data for each type of product and process specified which shall include:

1. Manufacturer’s Specification

2. Installation Instructions

3. Independent Test Data

4. Certification Requirements

5. Warranty Information

C. Submit anhydrous calcium chloride testing according to ASTM F 1869 (latest revision) and/or RH Probe Test according to ASTM F 2170 (latest revision). Tests shall be performed by the Owner's Special Inspector and results provided to the Architect, Owner, General Contractor, and Water Vapor Reduction System Manufacturer's Representative.

4. QUALITY ASSURANCE

A. Qualifications of Applicator

1. Employ an Applicator currently approved by the manufacturer, experienced in surface preparation and application of the material and subject to inspection of the manufacturer.

5. MANUFACTURER'S QUALIFICATIONS

A. Manufacturer shall have no less than ten (10) years experience in manufacturing water vapor reduction systems. The water vapor reduction system must be specifically formulated and marketed for water vapor reduction and alkalinity control without change of system design for a minimum period of five (5) years.

B. Manufacturer shall provide the Owner with their standard ten (10) year warranty at no additional cost. Applicator of water vapor reduction system shall provide standard installation warranty for workmanship.

C. Manufacturer must provide Independent lab test reports documenting performance per the following:

1. ASTM E 96, Water Vapor Transmission (wet method) Performance shall be documented by an independent testing laboratory at a minimum of 97% water vapor transmission reduction compared to untreated concrete.

2. ASTM E96- Perm Rating - Standard Test Method for Water Vapor Transmission of Materials – Perm Rate results must not exceed 0.1 Perms.

3. ASTM D 1308; Insensitivity to alkaline environment up to, and including, pH 14. A 14 day test is required with no degradation of sample reported.

4. Certify acceptance and exposure to continuous topical water exposure after final cure.

D. Submit list of product use and performance history, for the same formulation and system design, listing reference sources for at least 3 projects dating back for a minimum of 5 years.

6. DELIVERY, STORAGE AND HANDLING

A. Deliver products to the job site in their original unopened containers, clearly labeled with the manufacturer's name and brand designation.

B. Store products in an approved ventilated dry area; protect from dampness, freezing, and direct sun light. Product should not be stored in areas with temperatures in excess of 90 °F or below 50 °F.

C. Handle product in a manner that will prevent breakage of containers and damage products.

7. PROJECT/SITE CONDITIONS

A. ENVIRONMENTAL CONDITIONS

1. Do not apply moisture vapor reduction system to unprotected surfaces or when water is accumulated on the surface of the concrete.

2. Do not apply water vapor reduction system when temperature is lower than 50°F or expected to fall below this temperature within 24 hours from time of application.

B. PROTECTION: Protect water vapor reduction system to prevent damage from active rain or topical water for a minimum period of 24 hours from time of application.

8. SCHEDULING

A. Before installation of VCT, sheet vinyl, rubber flooring, wood, carpet and/or epoxy flooring systems over the interior concrete slabs, anhydrous calcium chloride testing ASTM F 1869 (latest revision) and/or RH Probe Tests ASTM F 2170 shall be performed by the Owner's Special Inspector as outlined In Article 3.1 below.

B. The Owner's Special Inspector will coordinate with the Owner scheduling water vapor reduction system testing and allowing enough time to test, submit and install the water vapor reduction system before installation of floor finish.

C. The Owner's Special Inspector will allow for as much time as is reasonable for the concrete slab to dry before installing anhydrous calcium chloride tests and/or RH Probe Tests. All mastics, glues, and/or contaminants shall be removed to provide a clean, sound, concrete substrate prior to installing anhydrous calcium chloride tests as per ASTM F 1869 (latest revision).

D. The water vapor reduction system must allow installation as early as 7 days after concrete placement.

PART 2 – PRODUCTS

9. MANUFACTURERS

A. Water vapor reduction system, which may be incorporated in the work, shall be the

product of a single manufacturer, no substitutions. Manufacturer's offering approved products:

1. VAP I® 2000 System by KOSTER American Corporation; Corporate Headquarters: (877) 425-1206 OR EQUAL BY Chem-Crete and Con-Cure.

B. Terminology hereafter is based upon the products of KOSTER American Corporation.

10. MATERIALS

A. General: Use materials of one manufacturer throughout the project as hereinafter specified.

B. 100% solids VAP I® 2000 epoxy coating, containing specifically formulated chemicals and resins to provide the following characteristics and properties in a one coat system. No multi-coat systems allowed. System must contain 100% epoxy resin solids.

1. ASTM E 96, Water Vapor Transmission (wet methods) Performance shall be documented by an independent testing laboratory at a minimum 97% for water vapor transmission reduction compared to untreated concrete.

2. ASTM E 96 Perm Rating – product cannot exceed a .1 perm rating

3. ASTM D 1308; Insensitivity to alkaline environment up to, and including, pH 14 in a 14 day bath test.

4. Certify acceptance and exposure to continuous topical water exposure after final cure.

5. Water Vapor reduction system shall be a single coat, stand alone system with no requirements for additional components such as sand broadcast for adhesion of flooring systems.

6. System must reduce Calcium Chloride readings of up to 25lbs/1000 ft^2/24 hrs by 97% in one coat. System must be able to perform as required with RH Probe readings of 100%.

C. KOSTER VAP I® Level Pro Self Leveling Underlayment

D. KOSTER VAP I® Level Pro Finish

E. KOSTER VAP I® 06 Primer

F. KOSTER VAP I® 2000

1. System consists of one (1) coat of VAP I® 2000. The Owner shall specify a floor covering system and adhesive having the ability to withstand water vapor transmission levels up to 3lbs/1000 ft^2/24 hr. The water vapor reduction system

shall be required to reduce water vapor emissions by a minimum of 97% after final cure, as well as alkalinity reduction to acceptable pH levels. Verify water vapor reduction by anhydrous calcium chloride testing prior to proceeding with any floor covering installation.

11. AREA NOT REQUIRING VAPOR REDUCTION SYSTEM

A. Anhydrous calcium chloride testing and/or RH Probe Tests performed by the Owner's Special Inspector for interior concrete slab areas receiving VCT, sheet vinyl, rubber flooring, wood, carpet, and or epoxy flooring systems will determine where this system may be required. Water vapor reduction system may be required on concrete floors with water vapor transmission level in excess of 3 lbs/1000 ft^2/24 hr or 5 lbs/1000 ft^2/24 hr for some specific flooring systems (verify with flooring system manufacturer.) RH Probe Test results of 75% or higher requires the installation of the vapor reduction system.

B. Water vapor reduction system is not required on interior concrete slabs without floor finishes.

12. MIX DESIGNS

A. Use clean containers and mix thoroughly as per Manufacturer's requirements to obtain a homogeneous mixture. Use a low speed motor less than 400 rpm and a two bladed Jiffy-type mixing blade only. DO NOT AERATE. Mix ratios are measured by volume.

B. VAP I® 2000 Mix Ratio: Mix Component A and B at a ratio of 2.4:1 by volume.

PART 3 – EXECUTION

13. EXAMINATION

A. Calcium Chloride and/or RH Probe test requirements:

1. Anhydrous calcium chloride testing shall be performed by the Owner's Special Inspector as outlined in Section 01410 - Quality Requirements.

2. Provide anhydrous calcium chloride tests according ASTM F 1869 (latest revision) protocols. Provide RH Probe Tests according to ASTM F 2170 protocols.

3. Only conduct calcium chloride tests at the same temperature and humidity expected during normal use. If this is not possible, then the test conditions should be 75°F +/-10°F and 50+/-10% relative humidity. Maintain these conditions 48 hours prior to and during testing. Water vapor transmission levels are directly affected by ambient room temperature and readings conducted without a sustained ambient temperature are NOT acceptable.

4. Owner's Special Inspector shall provide test results with a marked up floor finish plan showing test results. Owner's Special Inspector shall provide a written

clarification on status of the ambient air temperature and humidity before and during the testing procedures.

B. Concrete Slab Inspection

1. On existing slabs (primarily), testing for concrete deficiencies and contaminates such as un-reacted water-soluble silicates, chlorides, A.S.R. (alkali-silica reaction), oil contamination, etc. is strongly recommended by KOSTER to avoid bonding issues. These conditions may cause bonding concerns with all epoxy and finished floor coatings, including the KOSTER VAP I® 2000. This testing should be performed by the owner's independent testing agency using standard coring methods and review of the history of the slab installation if available. Concrete should conform to ACI Committee 201 Report "Guide to Durable Concrete."

C. Floor treatment calcium chloride tests:

1. After proper cure (>72 hrs min.) of the moisture vapor reduction system the Owner's Special Inspector shall provide calcium chloride tests to determine if the level of water vapor transmission and alkalinity are reduced to the Owner's specified levels in conjunction with the flooring manufacturer's installation requirements. Contact Owner and water vapor reduction system Manufacturer's Representative concerning areas with a water vapor transmission level greater than the Owner's specified levels.

D. Adhesion tests:

1. The Owner's Special Inspector shall verify proper adhesion of flooring adhesives, coatings, and leveling compounds to the final vapor reduction coating system for acceptability. Contact Manufacturer's Representatives for recommendations.

14. PREPARATION

A. Inspect all surfaces with regard to their suitability to receive moisture vapor reduction system with manufacturer's representative.

B. Clean all surfaces to receive moisture vapor reduction system. Shot blast all floors to a Concrete Surface Profile (CSP) #3 or #4 and clean surfaces with an industrial vacuum cleaner and remove all residues from the substrate. Grinding is allowed only in areas not accessible by shot blasting. Remove ALL defective materials, and foreign matter such as dust, adhesives, leveling compounds, paint, dirt, floor hardeners, bond breakers, oil, grease, curing agents, form release agents, efflorescence, laitance, Shot blast bee bees, etc. Repair all cracks, expansion joints, control joints, and open surface honeycombs and fill in accordance with Manufacturer's recommendations. If concrete additives such as chlorides or any other soluble compounds that may contaminate surfaces have been used in the concrete mix do not use this product on that floor without written approval from KOSTER American. Reinforcing fibers that are visible after shot blasting must be removed and vacuumed leaving no fibers left on the

concrete surfaces. Provide an uncontaminated, sound surface. DO NOT ACID ETCH!

C. Repair concrete prior to moisture vapor reduction system installation by using KOSTER SB Bonding Emulsion with approved concrete repair materials. Comply with all requirements as listed in Manufacturer's technical data information. Consult with vapor reduction manufacturer.

D. Ensure surfaces to be treated with moisture vapor reduction system have NOT previously been treated with other materials such as underlayments, screeds, penetrating sealants, silicates, etc. If this is the case, consult with the Manufacturer's Representative prior to any application of moisture vapor reduction system.

E. Any testing for concrete deficiencies or contamination such as alkali silica reaction, untreated silicates, organic residue, etc. is recommended and is the responsibility of the Building owner.

F. Shot blast a small test area and review surface profile with the finished flooring applicator. As the VAP I® 2000 is not a leveling material, make sure the flooring installer is aware that a feather finish or leveling material may be required to "flatten" or level the VAP I® 2000 treated concrete prior to the flooring installation.

15. APPLICATION

A. VAP I® 2000 System Application:

1. The coverage rates for this Single Coat system depends on the surface profile and porosity of the concrete substrate as well as the measured level of moisture, from Section 3.1 Examination. On average, a coverage rate of 75-150 ft^2/gal. may be expected. (See additional application instructions in KOSTER technical data sheets for specific coverage rates.)

B. Apply one coat of VAP I® 2000 using a squeegee and or 3/8 inch nap roller leaving NO areas untreated. Allow to cure a minimum of 12 hours before installing flooring system.

C. KOSTER Level Pro Self-Leveling underlayment system, or KOSTER Level Pro Finish in conjunction with the VAP I® 06 Primer is recommended if required by the Owner, floor covering installer, or the floor covering manufacturer to smooth and/or level surfaces after shot blasting and installation of the VAP I® 2000 water reduction system. Never apply KOSTER American vapor reduction systems over any new or existing cementitious underlayment system (especially if it is gypsum or calcium sulfate based), unless approved in writing by the Koester American Technical Staff, (no exceptions). When water based adhesives are used in the floor covering installation, use an approved underlayment system with primer prior to the installation of the flooring system. Please consult the adhesive manufacturer for their minimum recommended thickness of cementitious underlayment to absorb excess moisture in the adhesive. Note this is only for certain water based adhesives. Most adhesives will adhere to the KOSTER VAP I® 2000. Consult with KOSTER American Corporation for general guidelines.

16. CLEANING

A. Clean all tools and equipment with Xylene (or similar material) immediately after use when using the VAP I® 2000 System.

B. Remove all debris resulting from water vapor reduction system installation from project site.

17. PROTECTION

A. Protect each coat during specified cure period from any kind of traffic, topical water and contaminants.

END SECTION 09690

SECTION 09800 - ELASTOMERIC COATINGS

PART 1 – GENERAL

1. SUMMARY

A. Application of special elastomeric exterior coating system to all exterior exposed surfaces of plaster and existing concrete walls. Work includes cleaning, preparation of surface and filling of any cracks, prime coat and two (2) topcoats as follows.

1. Pigmented, emulsion type, flexible, breathable, elastomeric, high build, “breathable”, waterproof acrylic coating. Priming system designed for compatibility with substrates indicated.

2. The coating manufacturers representative must submit written verification on manufacturers letterhead that after the cleaning the substrate was inspected and found acceptable for the coating application, consistent with requirements for the specified warranty. The aforementioned verification must be received before starting the coating application

2. SUBMITTALS

A. Product Date: Submit manufacturer's technical information including basic materials analysis and application instructions for coating material specified.

1. List each material and cross-reference the specific coating and finish system and application. Identify each material by the manufacturer's catalog number and general classification.

B. Samples: Submit samples for review of colors and texture only. Provide a list of material and application for each coat of finish sample.

1. Provide samples of material to be applied, with colors and texture to simulate samples as requested until the required sheen, color and texture is achieved to match existing concrete building.

3. QUALITY ASSURANCE

A. Single Source Responsibility: Provide primers produced by the same manufacturer as the finish coats. Use only thinners recommended by the manufacturer, and only within recommended limits.

B. Applicator: A firm with not less than 10 years of successful experience in application of special coating types required on substrates similar to those of this project.

C. Coordination of Work: Ensure compatibility of the total systems for various substrates. Upon request, furnish information on characteristics of specified finish materials, to ensure that compatible prime coats are used.

1. Solvent strength shall not effect bond.

2. Notify the Architect of problems anticipated using the coatings systems specified.

D. Field Samples: On actual surfaces using the same equipment for general application duplicate coating finishes of prepared samples. Sample surfaces shall be cleaned of dirt, grease, rust, concrete dust or other foreign material that will interfere with optimum bond. Provide full-coat finish samples on at lest 100 sq. ft. of surface, until required sheen, color, and texture are obtained.

1. Final acceptance of colors will be from job applied samples.

2. The Architect will select surface to represent surfaces and conditions for each type of coating and substrate to be coated. Apply coatings on this surface as specified. After finishes are accepted, this surface will be used for evaluation of coating systems of a similar nature.

E. Material Quality: Provide the best quality grade of the coating as regularly manufactured by acceptable coating manufacturer. Materials not displaying manufacturer's identification as a best-grade product will not be acceptable.

F. Warranty: Provide a manufacturer five (5) year written limited warranty for Special Coatings to protect against water penetration, blistering and peeling and to maintain vapor permeability.

4. DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the job site in the manufacturer's original, new, unopened packages and containers bearing manufacturer's name and label and the following information.

B. Name or title of material.

1. Manufacturer's name, stock number and date of manufacture.

2. Contents by volume, for major pigment and vehicle constituents.

3. Thinning instructions.

4. Application instructions.

5. Color name and number.

6. Handling instructions and precautions.

C. Store materials not in actual use in tightly covered containers above ground at a minimum ambient temperature of 45 deg. F., in a well ventilated area. Maintain containers used in storage of coatings in a clean condition, free of foreign materials and residue.

1. Protect from extreme heat and freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary precautionary measures to ensure that workmen and work ares are adequately protected from fire hazards and health hazards resulting from handling, mixing and application of coatings.

2. Do not store or use materials that are over six (6) months old.

5. PROJECT CONDITIONS

A. Apply coatings only when the temperature of surfaces to be coated and surrounding air temperatures are above 40 deg. F. or below 95 deg. F., unless otherwise permitted by manufacturer's printed instructions.

B. Do not apply coatings in snow, rain, fog or mist,or when there is a chance of rain within 24 hours after application, or at temperatures less than 40 deg. F. or to damp or wet surface unless otherwise permitted by manufacturer's printed instructions. Allow wet surfaces to dry thoroughly and attain the temperature and conditions specified before proceeding with or continuing the coating operation. Protect surfaces from rain for 48 hours after application.

1. Test surfaces with moisture meter prior to application of coatings and only proceed with application if readings are within limits of coating manufacturer requirements.

C. Apply coatings in areas away from sparks or spark producing equipment. Do not use near fire, flame or heat; primer material is combustible. Avoid breathing.

PART 2 - PRODUCTS

6. ELASTOMERIC COATING MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products of one of the following:

1. Neogard

2. Quaker

3. Thoro Systems Products

4. Tnemec

5. VIP

6. Sonneborne

7. EXTERIOR ELASTOMERIC COATING MATERIALS

A. Exterior Primers: Provide factory pigmented formulated prime coat material compatible with the substrate and finish coats indicated, equal to 'Chalky Surface Primer VOC' by Sonneborne.

B. Finish Coats: Provide factory formulated, finish coat material compatible with the substrate and primer. Pigmented, emulsion type, flexible, elastomeric, high-build, "breathable" waterproof acrylic coating for application over all specified and primed surfaces:

1. NeoFlex Waterproof Elastomeric Coating System by Neogard

2. Quaker 650

3. Thorolastic by Thoro Systems Products

4. 156 Enviro - Crete by Tnemec

5. 8100 by VIP

6. Colorflex by Sonneborne

7. Colors shall be selected by the Architect

C. Miscellaneous Materials: Provide materials not specifically described, but required for complete and proper performance of the work and as recommended by the manufacturer of the special coatings. All materials must be compatible with the products in this specification section.

PART 3 - EXECUTION

8. EXAMINATION

A. Examine substrates and conditions under which coating will be performed for

compliance with requirements for application of coatings. Do not proceed with application until unsatisfactory conditions have been corrected.

1. Start of coating work will be construed as the Applicator's acceptance of surfaces within particular area.

9. PREPARATION

A. General: Remove hardware, plates, machined surfaces, light fixtures, and similar items which are not to be coated, or provide surface-applied protection prior to surface preparation and coating. Following completion of coating operations in each space or area, reinstall items removed, using workmen skilled in the trades involved.

1. Clean surfaces of dirt, grease, rust, concrete dust and other foreign material before applying coatings or surface treatments. Schedule cleaning and coating application so dust and other contaminants will not fall on wet, newly coated surfaces.

2. Mask all surfaces not to receive elastomeric coating.

B. Surface Preparation: Perform surface preparation repairs and cleaning of existing surfaces in compliance with the manufacturer's instructions for the particular substrate conditions prior to applying special coatings.

1. All caulking and sealants shall be thoroughly cured prior to application of special coatings. Surfaces to receive special coatings shall be dry. Notify the Architect in writing of anticipated problems using coatings specified with substrates primed or furnished by others.

C. Material Preparation: Carefully mix and prepare materials in compliance with the coating manufacturer's directions.

1. Mix materials before application to produce a mixture of uniform density, and as required during application. Do not stir film, which may form on surfaces, into the material. Remove film and, if necessary, strain the coating material before using.

10. APPLICATION-COATINGS

A. Test Application: Prior to general application of special coatings prepare a small application in an unobtrusive location for the purpose of demonstrating final effect of installation. Proceed with work only after Architect's acceptance of test application.

B. Apply special coatings and paint by brush and roller applicators in strict

accordance with manufacturer's printed instructions. Use brushes best suited for the material being applied. Use rollers as recommended by the manufacturer for the material and texture required.

1. Provide finish coats compatible with the primers used.

2. The number of coats and film thickness required is the same regardless of the application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer.

C. Minimum Coating Thickness: Apply each material at not thinner than the manufacturer's recommended spreading rate. Provide total dry film thickness of the entire system as recommended by the manufacturer but not less than 8 dry mils per coat.

D. Primer: See precautions at beginning of this section regarding combustibility.

1. Apply product as packaged - do not dilute or alter the material.

2. Apply sufficient material, to thoroughly wet the masonry surface. Avoid heavy streaks and runs. Brush out drips and runs that do not penetrate.

3. Allow surface to dry twenty-four (24) hours prior to application of pigmented elastomeric acrylic polymer masonry coating.

4. Protect treated surface from rain for a period of at least twenty-four (24) hours after application.

E. Pigmented Elastomeric Acrylic Polymer Finish Coating (Two Coats):

1. Apply product in its concentrated form and dry mil thicknesses in accordance with manufacturer's written instructions to obtain uniform pinhole free surface.

2. Apply first coat to primed surface with roller. Use sufficient material to thoroughly cover surfaces with continuous coating.

a. Back-roll to ensure complete coverage.

b. Work coating into surface.

3. Allow first coat to dry twenty-four (24) hours prior to application of second coat.

4. Apply second coat over first coat following same application procedure as first coat (roller and back-brush) to provide a uniform, monolithic

appearance with no ridges, brush strokes, runs, etc.

5. Allow second coat to dry forty-eight (48) hours before proceeding with additional work, if required, on surface.

6. Protect freshly coated surface from rain for a period of at least three (3) hours after application.

F. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish or recoat work not in compliance with specified requirements.

11. CLEANING

A. Clean-Up: At the end of each work day, remove rubbish, empty cans, rags and other discarded materials from the site.

12. PROTECTION

A. Protect work of other trades, whether to be coated or not, against damage from coatings. Correct damage by cleaning, repairing, replacing, and recoating as acceptable to the Architect. Leave in an undamaged condition.

1. Protect surfaces from splash and overspray of primer.

2. Remove inadvertent primer splashes immediately according to manufacturer's written instructions.

3. Cover live plant materials with drop cloths.

B. Provide "Wet Paint" signs to protect newly-coated finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of coating operations. At completion of construction activities of other trades, touch-up and restore damaged or defaced coated surfaces.

END OF SECTION

SECTION 09900 - PAINTING

PART 1 - GENERAL

1. SECTION INCLUDES

A. Surface preparation and field application of primers and finish paints and coatings.

B. Paint all exposed surfaces not prefinished under other sections of the specification and whether or not colors are designated in schedules, except where a surface or material is specifically indicated not to be painted or is to remain natural. Where an item or surface is not specifically mentioned, paint the same as similar adjacent materials or surfaces. Without restricting the extent of the work to be performed the work shall include, but not limited to, finishing of the following interior and exterior exposed surfaces:

1. Ferrous Metal: All ferrous metal work, including galvanized, both exterior and interior of building (which is not finished painted under other sections) as follows: doors, frames, fire extinguisher cabinets, and miscellaneous metal fabrications.

2. Gypsum Drywall: All exposed surfaces of walls and ceilings; see drawings for gloss level requirements and locations for epoxy paint. Also, priming where wallcovering is indicated with primers containing mildewcides.

3. Plaster: Elastomeric coating specified in Section 09800.

4. Note: See drawings for surfaces (drywall, CMU and metals) requiring herein specified interior performance paint.

2. RELATED SECTIONS

A. Section 06410 - Architectural Woodwork: Factory finished millwork.

B. Section 09800 – Elastomeric coatings.

C. Section 09260 - Gypsum Board Systems: Drywall finishing.

D. Factory primed items.

3. REFERENCES

A. ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.

B. ASTM D2016 - Test Method for Moisture Content of Wood.

C. NPCA (National Paint and Coatings Association) - Guide to U.S. Government Paint Specifications.

D. PDCA (Painting and Decorating Contractors of America) - Painting - Architectural Specifications Manual.

E. SSPC (Steel Structures Painting Council) - Steel Structures Painting Manual.

4. DEFINITIONS

A. Conform to ASTM D16 for interpretation of terms used in this Section.

5. SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Submit for each paint system specified, including block fillers, primers and finish coatings.

1. Provide the manufacturer's technical information including label analysis and instructions for handling, storage, and application of each material proposed for use.

2. List each material and cross-reference the specific coating, finish system, and application. Identify each material by the manufacturer's catalog number and general classification with heading indicating surfaces to be finished corresponding to the Paint Schedule herein.

3. Certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOC).

C. Submit samples for initial color selection in the form of manufacturer's color charts.

1. After color selection, the Architect will furnish manufacturer color numbers and/or color chips of another manufacturer to match for surfaces to be coated.

D. Submit Samples for Verification Purposes: Provide samples of each color and material to be applied, with texture to simulate actual conditions, or representative samples of the actual substrate.

1. Provide stepped samples, defining each separate coat, including block

fillers and primers for masonry coatings. Use representative colors when preparing samples for review. Resubmit until required sheen, color, and texture are achieved.

2. Provide a list of material and application for each coat of each sample. Label each sample as to surface, location and application.

3. Submit samples on the following substrates for the Architect's review of color and texture:

a. Ferrous Metal: Provide two (2) 4 inch square samples of flat metal and two (2) 8 inch long samples of solid metal for each color and finish.

b. Gypsum Board: Provide two (2) 12 inch square samples with texture selected

c. Masonry: Provide two (2) 12 inch square samples with texture selected

E. Manufacturer's Instructions: Indicate special surface preparation procedures, substrate conditions requiring special attention not included in the Product Data.

6. QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

B. Applicator: Company specializing in performing the work of this section with minimum five years documented experience.

C. Single-Source Responsibility: Provide primers and undercoat paint produced by the same manufacturer as the finish coats.

7. REGULATORY REQUIREMENTS

A. Conform to applicable code for flame and smoke rating requirements for finishes.

8. DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01600.

B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

C. Container label to include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

D. Store paint materials at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

9. ENVIRONMENTAL REQUIREMENTS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

C. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 deg. F. and 90 deg. F.

D. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 deg. F. and 95 deg. F.

E. Minimum Application Temperature for Varnish Finishes: 65 degrees F , unless required otherwise by manufacturer's instructions.

F. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

10. MOCK-UP

A. Before proceeding with painting, finish one complete space or item of each color scheme required. This shall include selected colors, finished texture, materials, and workmanship. After approval, three (3) sample spaces or items shall serve as a quality control sample for similar work throughout the Project.

11. EXTRA MATERIALS

A. Furnish under provisions of Section 01700.

B. Provide 1 gallon of each color and type to Owner.

C. Label each container with color, type, and room locations in addition to the manufacturer's label.

PART 2 - PRODUCTS

12. MANUFACTURERS

A. Standard: For purposes of designating type and quality for the work of this section, Drawings and Specifications are based on products manufactured or furnished by The Sherwin Williams Company except as noted specifically otherwise.

B. Manufacturers: Products of the following manufacturers having equal quality to those specified herein will be acceptable.

Benjamin Moore.
Devoe Reynolds
The Glidden Company
Fuller O'Brien
Kelley-Moore
Pratt & Lambert
PPG Industries
Porter

13. MATERIALS

A. Coatings: Ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating; good flow and brushing properties; capable of drying or curing free of streaks or sags.

1. NOTE: All coatings, except alkyd based systems, shall be 100% acrylic and shall be so indicated in the submittal Product Data.

B. Material Compatibility: Provide block fillers, primers, finish coat materials, and related materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by the manufacturer based on testing and field experience.

C. Material Quality: Provide the manufacturer's best-quality trade sale paint material of the various coating types specified. Paint material containers not displaying manufacturer's product identification will not be acceptable.

D. Colors: Provide color selections made by the Architect from the manufacturer's full range of colors and custom colors where required to match Architect's samples or paint colors from a manufacturer not selected to provide the products.

E. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.

F. Patching Materials: Latex filler.

G. Fastener Head Cover Materials: Latex filler.

PART 3 - EXECUTION

14. EXAMINATION

A. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

1. Notify the Architect about anticipated problems using the materials specified over substrates primed by others.

B. Verify that substrate conditions are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

D. Test shop applied primer for compatibility with subsequent cover materials.

15. PREPARATION

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted, or provide surface-applied protection prior to surface preparation and painting. Remove these items, if necessary, to completely paint the items and adjacent surfaces. Following completion of painting operations in each space or area, have items reinstalled by workers skilled in the trades involved.

B. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease prior to cleaning. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

C. Surface Preparation: Clean and prepare surfaces to be painted according to the manufacturer's instructions for each particular substrate condition and as specified.

1. Provide barrier coats over incompatible primers or remove and reprime. Notify Architect in writing about anticipated problems using the specified

finish-coat material with substrates primed by others.

D. Correct defects which affect work of this section.

E. Seal with shellac and seal marks which may bleed through surface finishes.

F. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

G. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.

1. Provide texture selected by the Architect.

H. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces with same primer as the shop coat.

I. Ferrous Metals: Clean ungalvanized ferrous metal surfaces that have not been shop-coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with recommendations of the Steel Structures Painting Council (SSPC).

1. Blast steel surfaces clean as recommended by the paint system manufacturer and according to requirements of SSPC specification SSPC-SP 10.

2. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.

J. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so that the surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.

16. APPLICATION

A. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to the manufacturer's printed instructions.

1. Brushes: Use brushes best suited for the material applied.

2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.

3. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.

B. Tinting: Tint each undercoat a lighter shade to facilitate identification of each coat where multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

C. Do not apply finishes to surfaces that are not dry.

D. Apply each coat to uniform finish.

E. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.

F. Sand metal lightly between coats to achieve required finish.

G. Vacuum clean surfaces free of loose particles. Use tack cloth just prior to applying next coat.

H. Allow applied coat to dry before next coat is applied.

17. WORKMANSHIP

A. Coverage and hide shall be complete. When color, stain, dirt, or undercoats show through final coat of paint, the surface shall be covered by additional coats until the paint film is of uniform finish, color, appearance, thickness, and coverage, at no additional cost to the Owner.

B. Give special attention to insure that edges, corners, crevices, welds and rivets receive a film thickness equivalent to that of adjacent painted surfaces.

C. Rate of application shall not exceed average rate of coverage recommended by manufacturer for the type of surface involved less ten (-10%) percent allowance for losses, unless manufacturer’s printed recommended specifications state that the recommended rate included normal expected losses.

D. Minimum dry film thickness per coat shall not be less than thickness recommended by the manufacturer.

E. Surface shall be free of skips in any coat, voids, pinholes, etc.

F. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before the final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.

G. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, nonspecular black paint.

H. Finish interior of wall and base cabinets and similar field-finished casework to match exterior.

I. Finish exterior doors on tops, bottoms, and side edges same as exterior faces.

J. Make edges of paint adjoining other materials or colors sharp and clean, and without overlapping.

K. The finished surfaces shall be free from runs, drops, ridges, waves, laps, brush marks; and free from variations in color, texture, and finish.

L. Do not paint wall surface more than 1/4" below the top of resilient base to eliminate the potential of paint being incompatible with base adhesive.

18. CLEANING

A. Clean work under provisions of 01700.

B. Collect waste material which may constitute a fire hazard, place in closed metal containers and remove daily from site.

19. SCHEDULE - SHOP PRIMED ITEMS FOR SITE FINISHING

A. Steel doors and frames, stairs and railings.

20. INTERIOR PAINT SCHEDULE

A. Interior Performance Paint: High performance water-based two-component polyurethane-fortified coating. Paint shall contain anti-microbial to inhibit the growth of mold, mildew, and bacterial from setting up on the dried paint film. The product shall meet or exceed 8000 scrub cycles on the ASTM D 2486 test.

1. Basis of Design: Products specified are “Scuffmaster ScrubTough” as manufactured by Master Coating Technologies. Items specified are to establish a standard of quality for design, function, materials, and appearance
2. Performance: VOC: Coatings shall have less than 50 g/l of VOC’s. Fire Rating: Coatings shall be Type I or Class A fire-rated, ASTM E 84. Scrub Test: Greater than 8000 cycles, ASTM D 2486. Impact Resistance: Greater than 60 in/lbs, ASTM D 2794. Chemical Resistance: 10 (test maximum) for all chemicals tested, ASTM D 1308. Finish: 10 percent to 15 percent gloss at 60 degrees. Stain Removal: 8 to 10 (test maximum)

for all stains tested, four-hour Open Spot Test

3. Warranty: The manufacturer shall warrant the work of this Section to be in accordance with the Contract Documents and free from faults and defects in materials for a period of five years from date of Substantial Completion. This special warranty shall extend the one year period of limitations contained in the General Conditions.

4. Primer: Provide primer recommended by manufacturer for substrate.

   a. Concrete and Masonry: Suitable heavy-bodied latex vinyl acrylic block filler. Provide manufacturer's recommended product if uniform base color with pores exposed is desired. Basis of Design: "Primemaster Primer/Sealer," Master Coating Technologies.

   b. Primed Metals: No primer required.

   c. Unprimed Metals:In accordance with the manufacturer's recommendations.

   d. New Gypsum Board: Basis of Design: "Primemaster Primer/Sealer," Master Coating Technologies.

5. Finish System Components:

   a. Finish Coat: Two-component polyurethane-fortified coating and cross-linker. Basis of Design: "Scuffmaster ScrubTough," Master Coating Technologies.

6. Miscellaneous Materials: Surface patching compounds and other materials necessary for application of finish system shall be of high quality and compatible with coating system.

7. Applicator shall apply coatings in accordance with manufacturer's written instructions.

   a. Apply as many primer coats as necessary to produce a uniform substrate appearance. Do not exceed manufacturer's recommended coverage rate. Allow to dry prior to application of subsequent coats.

   b. Re-prime suction and hot spots on substrate prior to applying base coatings.

   c. Over gypsum board, sand primer with 100 grit or finer sand paper. Thoroughly remove dust from sanding with a clean, wet rag.

d. Spray or roll finish to completely cover primer and according to manufacturer's written instructions. Apply in a continuous, even film at manufacturer's specified coverage rate

B. Metals (Semi-gloss):

1. One coat Pro-Cryl Universal Metal Primer B66-310 Series

2. Two Coats Pro Mar 200 Alkyd Semi-Gloss B34-2200 Series

C. Gypsum Wallboard (Flat):

1. One coat Preprite 200 Latex Wall Primer B28W200

2. Two coats Pro Mar 200 Flat Latex B30W200

D. Gypsum Board (Satin-low luster):

1. One coat Preprite 200Latex Wall Primer B28W200

2. Two coats Pro Mar 200 Latex Eg-Shell B20W200

E. Gypsum Wallboard (Semi-Gloss): Provide where indicated on the drawings

1. One coat Pro Mar 200 Latex Wall Primer B28W200

2. Two coats Incredicoat Latex Semi-Gloss B31WJ2 (Pencil hardness of "H" per ASTM D3363)

F. Concrete Masonry Units (Semi-Gloss, Filled):

1. One coat Loxon Block Surfacer A24W200

2. Two coats ProClassics Interior Latex Semi-Gloss B31 Series

G. Concrete Masonry Units (Eg-Shel-low luster, Filled):

1. One coat Loxon Block Surfacer A24W200

2. Two coats ProGreen 200 Low VOC Interior Latex Eg-Shell B20-600 Series

H. Gypsum Wallboard (Epoxy): Interior gypsum wallboard indicated "epoxy" shall be given:

1. One coat ProGreen 200 Low VOC Interior Latex Primer B28W600

2. Two coats Water Based Epoxy B70 Series/B60V15

21. EXTERIOR PAINT SCHEDULE

A. Galvanized Metal: Exterior galvanized metal shall be given:

1. One coat Pro-Cryl Universal Metal Primer B66-310 Series

2. Two coats Industrial Enamel B54 Series

B. Ferrous Metals: Exterior ferrous metal shall be given:

1. One coat Pro-Cryl Universal Metal Primer B66-310 Series

2. Two coats Industrial Enamel B54 Series

END OF SECTION

SECTION 09955 - WALL COVERING

PART 1 - GENERAL

1. SECTION INCLUDES

A. Surface preparation and prime painting.

B. Vinyl and textile wallcovering; products are indicated on the drawings and include “Laminated Protective Wallcoverings”,” Protective Wallcoverings” and “Digital Wall Mural”.

2. RELATED SECTIONS

A. Section 09260 - Gypsum Wallboard Systems: Wall substrate.

B. Section 09900 - Painting: Preparation and priming of substrate surfaces.

3. REFERENCES

A. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.

B. ASTM F793 - Classification of Wallcovering by Durability Characteristics.

C. NFPA 255 - Test of Surface Burning Characteristics of Building Materials.

D. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

4. SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Provide data on wall covering and adhesive.

C. Samples: Submit one sample of wall covering, 36 inch long by full width illustrating color, finish, and texture.

5. QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

B. Applicator: Company specializing in performing the work of this section with minimum three years documented experience.

6. REGULATORY REQUIREMENTS

A. Conform to applicable code for flame and smoke ratings of maximum 25/450 respectively.

7. DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01600.

B. Inspect roll materials on site to verify acceptance.

C. Protect packaged adhesive from temperature cycling.

D. Do not store roll goods on end.

8. ENVIRONMENTAL REQUIREMENTS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the adhesive or vinyl covering product manufacturer.

B. Maintain conditions 24 hours before, during, and after installation of adhesive wall covering.

C. Provide lighting level of 80 foot candles measured mid-height at substrate surfaces.

PART 2 - PRODUCTS

9. MATERIALS

A. Wall Coverings: See drawings

1. Laminated Protective Wallcovering: 0.030" gauge, Class A (FS of 15 and SD of 175) fabric backed vinyl walllcovering laminated to a sheet of semi-rigid PVC backing and finished with Tedlar PVC film. Equal to “Traffic Patterns” by Koroguard.

2. Protective Wallcovering: Integral color, Class A, 0.040" gauge, texture-Standard-Haircell, color-selected from manufacturers standard colors. Equal to “Korogard Protective Wallcoverings” by Koroseal. Provide accessory moldings to ensure accurate match of colors, dimensions and physical properties and color matched caulk.

3. Digital Wall Mural: Type II wallcovering complying with Federal Specifications CCC-W-408-D and CFFA-W-101-D standards with graphics applied equal to “Digital Wall Mural” by Eykon. Wallcovering shall contain mold and mildew inhibitors and pass the ASTM-G21 testing for mold and mildew resistance.6 murals each with different number -see drawings.

4. Vinyl Wallcovering: Type II; see drawings for product

B. Adhesive: "Premium" release type recommended by wall covering manufacturer to suit application to substrate.

C. Substrate Filler: As recommended by adhesive and wall covering manufacturers; compatible with substrate.

D. Substrate Primer and Sealer: White pigmented acrylic / latex base primer specifically formulated for use with vinyl wallcoverings.

PART 3 - EXECUTION

10. EXAMINATION

A. Verify site conditions under provisions of Section 01039.

B. Verify that substrate surfaces are prime painted and ready to receive work, and conform to requirements of the wall covering manufacturer.

C. Measure moisture content of surfaces using an electronic moisture meter. Do not apply coverings unless moisture content of surfaces are below 12 percent on gypsum board walls.

D. Verify flatness tolerance of surfaces does not vary more than 1/8 inch in 10 feet nor vary at a rate greater than 1/16 inch/foot.

11. PREPARATION

A. Fill cracks and smooth irregularities with filler; sand smooth.

B. Wash impervious surfaces with trisodium phosphate, rinse and neutralize; wipe dry.

C. Sand glossy surfaces; seal marks which may bleed with shellac.

D. Remove electrical, telephone, and wall plates and covers.

E. Apply one coat of primer sealer to substrate surfaces. Allow to dry. Lightly sand smooth.

12. INSTALLATION

A. Apply adhesive and wall covering in strict accordance with manufacturer's instructions.

B. Razor trim edges. One (1) blade per 10 foot cut on textile wall covering.

C. Apply wall covering smooth, without wrinkles, gaps or overlaps. Do not creas wallcovering, Allow to “relax” foro ten minutes. Eliminate air pockets and ensure full bond to substrate surface. Butt edges tight.

D. Horizontal seams are not acceptable, except as otherwise indicated. With all directional patterns, line up patterns at eye level allowing any drift in lineup to run off toward the ceilig and floor.

E. Do not seam within 2 inches of internal corners or within 6 inches of external corners.

F. Install wall covering before installation of bases, cabinets, hardware, or items attached to or spaced slightly from wall surface. Do not install wall covering more than 1/4 inch below top of resilient base.

G. Where wall covering stops at the edge of reveals, apply covering with contact adhesive within 6 inches of wall covering termination. Ensure full contact bond.

H. Remove excess wet adhesive from seam before proceeding to next wall covering sheet. Wipe clean with dry cloth.

13. CLEANING

A. Clean work under provisions of Section 01700.

B. Clean wall coverings of excess adhesive, dust, dirt, and other contaminants.

C. Reinstall wall plates and accessories removed prior to work of this Section.

14. PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Section 01500.

B. Do not permit work at or near finished wall covered areas.

END OF SECTION

SECTION 10160 - METAL TOILET PARTITIONS

PART 1 - GENERAL

1. SCOPE

A. This Section covers the furnishing and complete installation of metal toilet partitions, as shown on the drawings or herein specified.

2. SUBMITTALS

B. Toilet partitions shall be the flush stainless steel type with sound-deadending cores The partitions shall be provided complete with all fastenings, fittings, and hardware necessary for a satisfactory installation.

C. Quality Assurance Provisions: Prior to fabrication of the work, the manufacturer's standard color chart shall be submitted for color selection; scale and full-size drawings, showing the layout of all work in plan, elevation, and section, shall be submitted to the Engineer for approval. Drawings shall include complete details of construction showing thicknesses of metal, methods or fabrication and erection, anchoring, jointing, reinforcing, and provisions for the installation of hardware. Samples of materials for exposed and concealed work shall be submitted to the Engineer for approval prior to installation; the samples shall include sound-deadening cores, fastenings, hardware, a metal color sample showing the base metal, the prime and finish coat of enamel and three (3) 2.25 inches square test specimens of zinc-coated metal.

PART 2 - PRODUCTS

3. MATERIALS

A. Steel Sheets: Stainless steel, ASTM A666, Type 302/304, that is leveled to stretcher level flatness, finished on exposed surfaces as indicated herein, of the following minimum thicknesses:

1. Pilasters: 0.0375", Finished to 1 1/4"
2. Panels and Screens: 0.0375" (20 gauge)
3. Doors: 0.0312", Finished to 1"
3. Concealed Reinforcement for Tapping: 0.078"

B. Sound-deadening Cores: Sound-deadening cores shall be of corrugated paperboard, formed of panel weighing about 34 pounds per 1000 square feet. Cores of 6-ply construction shall be provided in panels and doors one (1) inch thick, and cores of 7-ply construction shall be provided in panels and

pilaster 1¼ inches thick. In lieu of corrugated paperboard construction the cores may be of kraft paper, weighing not less than 25 pounds per 1000 square feet, formed into a hexagonal honeycomb pattern containing cells of about one-inch size.

C. Doors and pilasters shall be Model Forum #CH-700 by Metpar Corp. (516-333-2600) or equal.

4. SUPPORTS, FITTINGS, AND FASTENINGS

A. Supports, fittings, and fastenings shall be of plain designs and heavy patterns.

B. Pilasters shall be anchored to walls with stirrup brackets of stainless steel, located near the top and bottom of panels or pilasters. Panels shall be anchored to pilasters with similar stirrup brackets. Each stirrup bracket shall be fastened to wall with two (2) ¼ inch diameter zinc or cadmium plated steel screws, and fiber or metal expansion shields. Each stirrup bracket shall be fastened to the pilaster with machine screws into tapped reinforcement or rivet nuts, and through-bolted to panel with 3/16 inch binder post bolts with on-way heads.

5. DOOR HARDWARE

A. Stainless Steel Hardware: 18-8, type 304 stainless steel with satin finish.

1. Chrome plates "Zamac" is not permitted

B. Each door shall be provided with all hardware, door hinges, latch, stop and keeper, coat hook, as well as all necessary fittings and fastenings for complete operation. Non-operating parts, supporting and encasing members, latch and coat hook shall be stainless steel. Exposed parts and fastenings which are not integral with door or pilaster shall be stainless steel.

C. Hinges shall have either roller bearings operating or inclined cams or opposed nylon telescoping cams aligned over a steel pintle, and shall be actuated by gravity or springs. All working parts shall be concealed within the door. Top pivot hinges shall have Delrin or polished hardened chromium steel guide pins secured above and below their point of bearing, placed in a cut-out near top of door and shall compensate for any vertical movement of doors. Hardened chromium steel shall be used for ball bearing rollers and cams. All moving parts shall operate in self-oiling graphite bronze, nylon, or thrust-frictionless bearings.

D. The latch shall be a concealed-type or sliding type, and shall consist of an encased bar, approximately ¾ inch wide by three (3) inches long, operated by a knob under spring tension. A stainless steel bolt, actuated by a cam mechanism of stainless steel, installed between face plates of doors, may be used. The latch shall mounted on the door midway between top and bottom edges. Combination stop and keeper with rubber bumper shall be mounted on the pilaster opposite the latch.

F. Hinges, keepers, and bumpers shall be through-bolted with binder post to pilasters, or hinges may be supported on cast alloy brackets finished to match. Latches and coat hooks shall be surface applied with machine screws into tapped reinforcement or rivet nuts. Self-tapping sheet metal screws will not be permitted. Binder post bolts and machine screws shall have right-hand, one-way, theft-resistant heads.

6. STAINLESS STEEL FINISH

A. Stainless Steel Surfaces: Remove or blend tool and die marks an dstetch lines into finish. Grind and polish surfaces to produce uniform, directional texture polished finish; No. 4 finish.

7. ACCESSORIES

A. Each partition shall be equipped with a roll paper holder complying with Section 10800-Toilet Accessories attached with machine screws into tapped reinforcement or rivet nuts, and shall be finished similar to non-operating door parts.

PART 3 - EXECUTION

8. INSTALLATION

A. The work shall be secured to contiguous construction in a rigid and substantial manner, straight and plumb, with uniform clearance of one (1) inch between pilasters and walls and not more than 3/16 inch between pilasters and doors. Evidence of drilling in floors and walls shall be concealed in the finished work. Hardware shall be adjusted for proper operation, and hinges shall be set to hold the doors ajar about 30 degrees when unlatched. All installation, all exposed surfaces shall be thoroughly cleaned, and all damaged work shall be restored to its original condition, or replaced with new work. The exposed heads of unfinished steel bolts and screws shall be neatly painted to match the color of adjoining partition surfaces.

END OF SECTION

SECTION 10260 - WALL AND CORNER GUARDS

PART 1 - GENERAL

1. DESCRIPTION

A. 3-1/2" x 3-1/2" x height indicated on the drawings, stainless steel corner guards at outside corners of partitions.

2. SUBMITTALS

A. Samples: 12 inch long piece of corner guard.

B. Manufacturer's Literature and Data: Show method of attachment and model number, size, etc.

3. DELIVERY, STORAGE AND HANDLING

A. Deliver material in original package marked to identify the contents, brand name, and the name of the manufacturer or supplier.

B. Store in dry and protected location.

C. Do not open packages until contents are needed for installation, unless verification inspection is required.

PART 2 - PRODUCTS

4. MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide impact-resistant wall protection system products equal to products by Afco-USA (American Floor Products Co.), Inc., Arden Architectural Specialties, Inc., and Pawling Corporation.

5. MATERIALS

A. Stainless-Steel Plate: Type 304, minimum 16 gauge thickness.

B. Mounting Material: Contact cement of type recommended by the manufacturer for use with material on the substrate indicated.

6. CORNER GUARDS

A. Stainless-Steel Corner Guards: Paper-covered, satin-finish, 16 gauge, stainless-steel sheet corner guards; height as indicated and if not indicated, provide 4 foot height. Provide 90-degree and 135-degree turn as required, unless otherwise indicated; and formed edges.

1. Wing Size: 3-1/2 by 3-1/2 inches

2. Corner Radius: 1/8 inch (3.2 mm).

3. Finish: No.4, directional polish, run grain with long dimension.

7. FABRICATION

A. General: Fabricate impact-resistant wall protection systems to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including thicknesses of components.

B. Fabricate components with tight seams and joints with exposed edges rolled. Provide surfaces free of roll marks, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

PART 3 - EXECUTION

8. INSTALLATION

A. Comply with the written recommendations of the manufacturer for secure, level, plumb and proper installation. Install the work in locations indicated on the Drawings, with proper anchorage.

B. Remove excess adhesive as recommended by manufacturer.

END OF SECTION

SECTION 10440 - SIGNAGE

PART 1 - GENERAL

1. SECTION INCLUDES

A. Interior dimensional letters of light weight fabricated metal construction.

B. Interior sign of aluminum construction with arched face and changeable insert

C. Exterior wall mounted sign, of aluminum construction, flat face and non-illuminated.

2. REFERENCES

A. ADAAG - Americans with Disabilities Act Accessibility Guidelines.

B. ANSI A117.1 - American National Standard for Buildings and Facilities - Providing Accessible and Usable Buildings and Facilities.

3. SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's literature for standard components.

C. Shop Drawings: Provide shop drawings for fabrication and erection of signs. Include plans, elevations, and large-scale sections of typical members and other components. Show anchors, grounds, reinforcements, accessories, layout, and installation details.

D. Shop Drawings: Show each sign type, style, colors and method of attachment. For each sign, show type, lettering, location, and dimensions.

1. Provide message list for each sign required, including large-scale details of wording and layout of lettering.

2. For signs supported by or anchored to permanent construction, provide setting drawings, templates, and directions for installation of anchor bolts and other anchors to be installed as a unit of Work in other Sections

E. Samples: Provide the following samples of each sign component for initial selection of color, pattern and surface texture as required and for verification of compliance with requirements indicated.

1. Initial Selection: Manufacturer's color charts consisting of actual selections of material including the full range of colors available for each material required.

2. Samples: Provide a sample panel not less than 8-1/2 inches by 11 inches for each material indicated. Include a panel for each color, texture, and pattern required. On each panel include a representative sample of the graphic image process required, showing graphic style, and colors and finishes of letters, numbers, and other graphic devices.

4. QUALITY ASSURANCE

A. Regulatory Requirements: Comply with requirements for assuring access for persons with disabilities in accordance with federal and local regulations, including:

1. Americans with Disabilities Act Accessibility Guidelines (ADAAG) and local amendments and modifications

B. Single Source Responsibility: For each separate type of sign required from a single manufacturer.

1. Specifications are based on ASI.

C. The specifications are basic minimum requirements and if more stringent requirements are needed to comply with ADA, those must be provided.

5. DELIVERY, STORAGE, AND HANDLING

A. Package signs separately or in like groups of names, labeled as to names enclosed. Include installation template, attachment system, and installation instructions.

6. ENVIRONMENTAL REQUIREMENTS

A. Do not install signs until ambient temperature has reached that recommended by sign manufacturer and will be maintained at that temperature during and after installation of signs.

PART 2 - PRODUCTS

7. INTERIOR DIMENSIONAL LETTERS

A. Acceptable Manufacturers: Equal to “LF Series” by ASI Signage Innovations, 1101 24th Street Kenner, Louisiana 70062-5266; (504) 704 1000 telephone.

B. Letter Materials: Stainless Steel in Polished Face and Sides, satin finish where indicated on the drawings

C. Fabricated Letters:

1. Height/Depth: As indicated on the drawings.

2. Letter style: Futura Medium

3. Logo: Camera ready art of logo.

D. Mounting Method: Projecting Mount

8. INTERIOR SIGN OF ALUMINUM CONSTRUCTION WITH ARCHED FACE AND CHANGEABLE INSERT

A. Acceptable Manufacturers: Equal to “Horizon Series arched sign face sign” by ASI Signage Innovations, 1101 24th Street Kenner, Louisiana 70062-5266; (504) 704-1000 telephone.

B. Interior Double-Sided Suspended Directional/Identity Signs:

1. Arched face anodized aluminum frame size (one side): Specify size: 11.8” height x 47.24” width.

2. Graphic insert size (one side): 11” panel height x 47.12” width; One arched aluminum graphic panel per sign side.

3. Clear Anodized Aluminum Frame: Selected from Standard Color Options

4. Clear Anodized Aluminum End Caps: Selected from Standard Color Options

5. Accent Bar Standard Color Options

6. Panel color: As indicated on the drawings

7. Letter styleand letter size: Selected from manufacturer's standard letter styles chart.

8. Text or graphic technique:

a. LTV series vinyl letters

b. Digitally Printed Vinyl Graphics

9. Text vinyl color: Selected from manufacturer's standard color chart

10. Text schedule: As indicated on the drawings

11. Suspension Mounting: Internally mounted aircraft cable for ceiling suspension

C. Interior Double-Sided Flag Mounted Signs:

1. Arched face anodized aluminum frame size (one side): Specify size: 15.5” height x 11.8” width.

2. Graphic insert size (one side): 15” panel height x 11.69” width; One arched aluminum graphic panel per sign side.

3. Clear Anodized Aluminum Frame: Selected from Standard Color Options

4. Clear Anodized Aluminum End Caps: Selected from Standard Color Options

5. Accent Bar: Standard Color Options

6. Panel color: manufacturer's standard color chart.

7. Letter style and letter size: selected from manufacturer's standard letter styles chart.

8. Text or graphic technique:

   a. LTV series vinyl letters

   b. Digitally Printed Vinyl Graphics

9. Text vinyl color: Selected from manufacturer's standard color chart.

10. Text schedule: As indicated on the drawings

11. Suspension Mounting: Internally mounted aircraft cable for ceiling suspension

D. Interior Wall-Mounted Directional Sign:

1. Arched face anodized aluminum frame. Size: as indicated o the drawings

2. Clear Anodized Aluminum Panels. Size: as indicated o the drawings; color selected from Standard Color Options

3. Clear Anodized Aluminum End Caps: color selected from Standard Color Options

4. Panel color: selected from Standard Color Options

5. Letter styles and letter size: Selected from manufacturer's standard letter styles chart.

6. Text schedule: as indicated o the drawings

7. Text or graphic technique:

a. LTV series vinyl letters

b. Silk Screened Graphics

8. Wall Mounting: Concealed mechanical mounting brackets through aluminum frame

E. Interior Wall-Mounted Room Identity Signs:

1. Arched face anodized aluminum frame size: 8.75" (height) x 7.87” (width)

2. Panel insert area size 8.24"(height) x 7.76” (width)

3. Accent Bar: Selected from Standard Color Options

4. Clear Anodized Aluminum End Caps - Selected from Standard Color Options

5. Inserts: ADA insert. Material: Provide tactile copy and Grade 2 Braille raised 1/32 inch minimum from plaque first surface by manufacturer’s aluminum backed photopolymer process. Sign face of single material (.040 aluminum backed photopolymer), tactile characters and Braille integral to photopolymer. Adhesive-fixed characters are not acceptable.

6. Wall Mounting: VHB tape and silicone or mechanically fasten with bracket mounting.

F. Interior Wall-Mounted Elevator Evacuation Signs with Updateable Insert Area:

1. Arched face anodized aluminum frame size: 11.75” (height) x 11.8” (width)

2. Panel insert area size: 11.125” (height) x 11.69” (width)

3. Accent Bar: Selected from Standard Color Options]

4. Clear Anodized Aluminum End Caps - : Selected from Standard Color Options

5. Inserts: Acrylic cover lens with matte finish. For use with 11" x 17" paper size (cut down to insert size)

6. Paperflex panel for updateable digitally printed Graphic Film or Paper Insert Window; for use with 11" x 17" paper size (cut down to insert size); Acrylic cover lens with matte finish

7. Wall Mounting: VHB tape and silicone or mechanically fasten with bracket mounting.

G. Materials and Components:

1. Aluminum Frames: Extruded aluminum, AA 6063

2. Anodize - Properties (Alubin, Milram) BS 1615

3. Acrylic Covers / Properties (Palram)Excellent weather resistance and long stability against UV degradation

4. PETG Covers / Properties (Palram) High impact resistance UV protective layer / weather resistant Face Components:

a. ADA-Ready Panels: .040" Aluminum-based photopolymer tactile and Braille characters with high temperature cured polyester color coating.

b. Graphic Panels: Thickness varies per application and material from .020" to .069".

5. Supports, Fixtures, and End Caps: As required for a complete and finished installation.

H. Painted Surface Treatment Finish: Manufacturer's standard two-phase finishing process. Colors as selected from manufacturer's standard colors.

1. Phase One: Priming with 2u depth layer for optimum surface coat adhesion and weatherability.

2. Phase Two: Painting process employing two component, acrylic polyurethane coating of 20-30u depth.

I. Powder Coated Finish:

1. General: The standard powder coat finish consists of a Polyester or TGIC (Triglycidyl Isocyanurate) Polyester.

2. Surface Preparation and Powder Coating: The exterior surface is cleaned in a minimum 5 stage wash system prior to the powder application. Then all exterior surfaces are coated with either a Polyester or TGIC (Triglycidyl Isocyanurate) Polyester powder. The powder coating is electrostatically applied to an average film thickness (DFT) of 3.0 mils (0.003”) and then cured in a gas fired convection oven at a temperature range of 350° F - 400° F. The thermosetting powder resin provides both inner coat as well as substrate fusion adhesion

9. EXTERIOR SIGN, OF ALUMINUM CONSTRUCTION, FLAT FACE AND NON-ILLUMINATED.

A. Acceptable Manufacturers: Equal to “Messenger Series” by ASI Signage

Innovations, 1101 24th Street Kenner, Louisiana 70062-5266; (504) 704-1000 telephone

B. Exterior Wall Mount Signs.

1. Aluminum panel size: As indicated on the drawings

2. Panel color: To match existing signage

3. Text or graphic colors: To match existing signage

4. Letter style and letter size: To match existing signage

5. Graphic technique:

a. LTV series vinyl letters.

6. Text schedule: As indicated on the drawings

7. Wall Attachment: Painted steel vertical attachment brackets, two per panel.

C. Materials and Components:

1. Aluminum Panels: Extruded aluminum, alloy 6063, with high temperature cured polyester color coating[Wall Sign: 3/64”

D. Surface Treatment Finish: Manufacturer's standard two-phase finishing process. Colors as selected from manufacturer's standard colors.

1. Phase One: Chromatized priming with 2u depth chrome layer for optimum surface coat adhesion and weatherability.

2. Phase Two: Painting process employing two component, water-based, non-toxic, lead-free, zero emissions, high temperature cured polyester coating of 20-30u depth

E. FABRICATION – GENERAL

F. General: Comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction. Create signage to required sizes and layout. Comply with requirements indicated for design, dimensions, finish, color, and details of construction

G. Preassemble signs in the shop to the greatest extent possible to minimize field assembly. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in a location not exposed to view after final assembly.

H. Conceal fasteners if possible; otherwise, locate fasteners to appear inconspicuous.

I. Design, fabricate, and install sign assemblies to prevent buckling, opening up of joints, and over-stressing of welds and fasteners Form panels to required size and shape. Comply with requirements indicated for design, dimensions, finish, color, and details of construction.

J. Coordinate dimensions and attachment methods to produce message panels with closely fitting joints. Align edges and surfaces with one another in the relationship indicated.

K. Mill joints to a tight, hairline fit. Form joints exposed to the weather to exclude water penetration

L. Allow for thermal movement resulting from a maximum ambient temperature change (range) of 100 deg F (38 deg C). Design, fabricate, and install sign assemblies to prevent buckling, opening up of joints, and over-stressing of welds and fasteners.

M. Increase material thickness or reinforce with concealed stiffeners or backing materials as required to produce surfaces without distortion, buckles, warp, or other surface deformations

PART 3 - EXECUTION

10. EXAMINATION

A. Verify site conditions are acceptable and substrates are ready to receive signs.

11. PREPARATION

A. Protect adjacent areas during sign installation; take special precautions as necessary to prevent adhesives from coming into contact with finished surfaces.

B. Surface Preparation: Clean surfaces and prepare as recommended by sign manufacturer for proper attachment of signs.

12. INSTALLATION

A. Install signs in accordance with manufacturer's recommendations and installation instructions. Install level, plumb, true to line, and with sign surfaces free from distortions and defects. Install product level, plumb, and at heights indicated

B. Install signs within the following tolerances and in accordance with manufacturer's recommendations:

1. Interior Signs: Within 1/4 inch vertically and horizontally of intended

location.

2. Exterior Signs: Within 1 inch vertically and horizontally of intended location.

C. Install signs after surfaces to which they are to be mounted have been completely finished.

D. Install in locations indicated on drawings and in conformance to applicable regulatory requirements to conform to Americans with Disabilities Act Accessibility Guidelines (ADAAG) and applicable local amendments and regulations.

13. CLEANING AND PROTECTION

A. Clean sign surfaces in accordance with manufacturer recommendations. Replace components where repairs were made but are still visible to the unaided eye from a distance of 10 feet

B. Protect signs from damage until substantial completion.

END OF SECTION

SECTION 10522 - FIRE EXTINGUISHERS, CABINETS, AND ACCESSORIES

PART 1 - GENERAL

1. SECTION INCLUDES

A. Fire extinguishers at each cabinet.

B. Semi-recessed steel cabinets with square trim, solid door face, except surface mounted extinguishers where indicated on the drawings.

C. Accessories.

2. RELATED SECTIONS

A. Section 09260 - Gypsum Board Systems: Roughed-in wall openings.

B. Section 09900 - Painting: Field paint finish of doors.

3. REFERENCES

A. ANSI/NFPA 10 - Portable Fire Extinguishers.

B. ANSI/UL 92 - Fire Extinguisher and Booster Hose.

C. ANSI/UL 711 - Rating and Fire Testing of Fire Extinguishers.

D. UL 299 - Dry Chemical Fire Extinguishers.

4. SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Indicate cabinet physical dimensions, rough-in measurements for recessed cabinets, wall bracket mounted measurements and location.

C. Product Data: Provide extinguisher operational features, color and finish and anchorage details.

D. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.

5. OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Section 01700.

B. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

6. QUALITY ASSURANCE

A. Provide units conforming with ANSI/UL 711 or ANSI/UL 92

7. REGULATORY REQUIREMENTS

A. Conform to applicable code for requirements for extinguishers.

8. ENVIRONMENTAL REQUIREMENTS

A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 - PRODUCTS

9. MANUFACTURERS

A. Larsen's Manufacturing Co., see below for model numbers or equal by J. L. Industries and Potter Roemer:

1. Cosmopolitan Series with solid door, semi-recessed with 1-1/2” square edge trim.

10. EXTINGUISHERS

A. Multi-Purpose Dry Chemical Type: UL 299, Cast steel tank, with pressure gage; U.L. rating 2A-10B:C, 5 lb. capacity for Class A, B and C fires.

1. Provide above at all locations except provide 4A-60B:C, 10 lb. capacity at Mechanical Rooms.

11. CABINETS

A. Metal: Formed steel sheets, minimum 18 gage thick base metal.

B. Door: 18 gage thick steel , reinforced for flatness and rigidity, 5/8" thick.

C. Cabinet Mounting Hardware: Appropriate to cabinet.

12. ACCESSORIES

A. Extinguisher Brackets: Prefinished steel, white enamel finish.

B. Cabinet Signage: Die-cut letters.

13. FABRICATION

A. Form cabinet enclosure with right angle inside corners and seams with square edges for semi-recessed mounting.

B. Exposed Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim and wall return at outer edge (backbend); square trim of 1-1/2 inch backbend depth.

C. Hinge doors for 180 degree opening with manufacturers standard concealed or continuous piano hinge. Provide nylon roller type catch. Door shall have lever handle with cam-action latch.

D. Weld, fill, and grind exposed components smooth.

E. Pre-drill for anchors.

14. FINISHES

A. Extinguisher: Steel, enamel to red color.

B. Cabinet Exterior Trim and Door: Steel, factory prime painted on all exposed surfaces.

C. Cabinet Interior: White enamel.

PART 3 - EXECUTION

15. EXAMINATION

A. Verify rough openings for cabinet are correctly sized and located.

16. INSTALLATION

A. Install in accordance with manufacturer's printed instructions. Each cabinet shall have a fire extinguisher as specified.

1. Location: As indicated on the Drawings and if not indicated, provide units and install at location directed by the Architect as required by NFPA 10.

B. Install cabinets plumb and level in wall openings.

C. Secure rigidly in place.

D. Place extinguishers and accessories in cabinets.

END OF SECTION

SECTION 10800 - TOILET ACCESSORIES

PART 1 - GENERAL

1. SECTION INCLUDES

A. Toilet accessories. Refer to Schedule on Drawings

B. Attachment hardware.

2. PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

A. Section 06100 - Carpentry or 09260 Gypsum Board Systems: Installation of concealed anchor devices and backing plate reinforcement.

3. RELATED SECTIONS

A. Section 09260 Gypsum Board Systems: In wall framing and plates for support of accessories.

B. Section 08800 - Glazing: Frameless wall mirrors.

C. Section 10165 - Plastic Laminate Toilet Compartments: Toilet compartments.

4. REFERENCES

A. ADA - American with Disabilities Act of 1990, Title III (Accessibility Regulations for Private Entities) and latest amendments (if any).

B. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible To and Usable by Physically Handicapped People.

C. ANSI/ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars and Strips.

D. ANSI/ASTM A366 - Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.

E. ANSI/ASTM B456 - Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.

F. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.

G. ASTM A269 - Seamless and Welded Austenitic Stainless Steel Tubing for General Service.

5. SUBMITTALS

A. Submit product data under provisions of Section 01300.

B. Provide product data on accessories describing size, finish, details of function, attachment methods. Include schedule showing proposed model numbers and mounting heights.

6. KEYING

A. Supply two keys for each accessory to Owner.

B. Master key all accessories.

7. REGULATORY REQUIREMENTS

A. Conform to applicable code for installing work in conformance with ANSI A117.1.

B. Comply with requirements of the American with Disabilities Act of 1990, Title III (Accessibility Regulations for Private Entities) and latest amendments (if any).

8. SEQUENCING AND SCHEDULING

A. Coordinate the work of this Section with the placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

PART 2 - PRODUCTS

9. MANUFACTURERS

A. The Drawings and Specifications are based on products manufactured by Bobrick Washroom Equipment, Inc., unless otherwise indicated in the Accessory Schedule, to establish standards of quality and design. The following manufacturers are acceptable to provide products equal to those specified:

1. Bradley Corporation

2. The Charles Parker Company

3. American Specialties, Inc.

4. American Dispenser Company

B. Substitutions: Under provisions of Section 01600.

10. MATERIALS

A. Sheet Steel: ANSI/ASTM A366.

B. Stainless Steel Sheet: ASTM A167, Type 304.

C. Tubing: ASTM A269, stainless steel.

D. Fasteners, Screws, and Bolts: Hot dip galvanized.

E. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

11. FABRICATION

A. Weld and grind smooth joints of fabricated components.

B. Form exposed surfaces from single sheet of stock, free of joints.

C. Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.

D. Back paint components where contact is made with building finishes to prevent electrolysis.

E. Shop assemble components and package complete with anchors and fittings.

F. Provide stainless steel anchor plates, adapters, and anchor components for installation.

G. Hot dip galvanize exposed, painted ferrous metal and fastening devices.

H. Comply with fabrication standards indicated by the established quality standard with attention brought to the following requirements:

1. Grab Bars: Minimum 13 gauge stainless steel tenon plates, bar return of 90 degrees, shot and concealed mounting to withstand loads specified herein and required by ADA.

a. Provide 16 gauge stainless steel back plate anchor at toilet partitions.

2. Pulls: Stainless steel pulls; applied plastic pulls are not acceptable.

3. Waste Receptacles: Removable from frame and all edges hemmed, full backs of stainless steel.

4. Towel Dispensers: All exposed edges hemmed, full backs of stainless steel.

5. Trim Flanges: One-piece seamless construction without mitered corners.

6. Hinges: Stainless steel full length piano hinges at all doors and lids.

12. GRAB BARS PERFORMANCE REQUIREMENTS

A. Size and Spacing of Grab Bars: The diameter or width of the gripping surfaces of a grab bar shall be 1-1/4 inch to 1-1/2 inch or the shape shall provide an equivalent gripping surface. If grab bars are mounted adjacent to a wall, the space between the wall and the grab bar shall be 1-1/2 inch.

B. Structural Strength: The structural strength of grab bars, fasteners, and mounting devices shall meet the following specifications:

1. Bending stress in a grab bar induced by the maximum bending moment from the application of 250 lbf shall be less than the allowable stress for the material of the grab bar.

2. Shear stress induced in a grab bar by the application of 250 lbf shall be less than the allowable shear stress for the material of the grab bar. If the connection between the grab bar and its mounting bracket or other support is considered to be fully restrained, then direct and torsional shear stresses shall be totaled for the combined shear stress, which shall not exceed the allowable shear stress.

3. Shear force induced in a fastener or mounting device from the application of 250 lbf shall be less than the allowable lateral load of either the fastener or mounting device or the supporting structure, whichever is the smaller allowable load.

4. Tensile force induced in a fastener by a direct tension force of 250 lbf plus the maximum moment from the application of 250 lbf shall be less than the allowable withdrawal load between the fastener and the supporting structure.

5. Grab bars shall not rotate within their fittings.

13. FACTORY FINISHING

A. Galvanizing: ANSI/ASTM A123 to 1.25 oz/sq yd.

B. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.

C. Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats electrostatic baked enamel.

D. Chrome/Nickel Plating: ANSI/ASTM B456, Type SC 2 satin finish.

E. Stainless Steel: No. 4 satin luster finish.

PART 3 - EXECUTION

14. EXAMINATION

A. Verify that site conditions are ready to receive work and dimensions are as indicated on shop drawings or as instructed by the manufacturer.

B. Beginning of installation means acceptance of existing conditions.

15. PREPARATION

A. Deliver inserts and rough-in frames to site at appropriate time for building-in.

B. Provide templates and rough-in measurements as required.

C. Verify exact location of accessories for installation.

16. INSTALLATION

A. Install fixtures, accessories and items in accordance with manufacturers' printed instructions.

B. Install plumb and level, securely and rigidly anchored to substrate with concealed fastening system.

C. Install concealed mounting devices and fasteners fabricated of the same material as the accessories.

D. Install exposed mounting devices and fasteners finished to match the accessories.

E. Provide theft-resistant fasteners for all accessory mountings.

F. Secure toilet room accessories in accordance with the manufacturer's instructions for each item and each type of substrate construction.

1. Where no mounting height is indicated on the Drawings, install accessories at heights recommended by the manufacturers to comply with ADA requirements which shall be verified with the Architect.

17. CLEANING

A. Remove soil, stain, and extraneous materials caused by accessory installation.

B. Remove and replace items and materials that cannot be satisfactorily cleaned.

18. SCHEDULE

A. Refer to Schedule on Drawings.

END OF SECTION

SECTION 14245 - HYDRAULIC ELEVATORS

PART 1 - GENERAL

1. SECTION INCLUDES

A. Passenger elevators.

B. Hydraulic elevator systems; telescoping "holeless" dual jack system.

C. Cab with doors and frames; hoistway entrance doors and frames.

D. Motor and pump, controllers, hoistway, equipment, and all accessories for a complete installation.

E. The Contractor is responsible to assure his equipment will operate satisfactorily within the specified conditions. If modifications are required, it shall be the Contractor's responsibility to make any necessary changes as needed.

1. Should any equipment be furnished that will not properly function within the specified parameters, it shall be the Contractor's responsibility to pay any additional costs attributable to providing the correct equipment.

F. Successful elevator vendor must provide a priced spare parts list with prices good for at least three (3) years and indicate availability of spare parts. Also provide a "Full Maintenance" proposal for one (1) year beyond the specified maintenance requirements for the first year including cost, services, terms and conditions on vendor letterhead.

G. If proprietary diagnostic equipment or special tools are required for elevator maintenance, the diagnostic equipment must be supplied with the elevator.

H. Elevator vendor must include cost and description of training available for Owner.

2. RELATED SECTIONS

A. Section 05500 - Metal Fabrications: Pit ladder and sill supports.

B. Section 07145 - Waterproofing: Waterproofing of elevator pit walls and floor.

C. Section 09260 - Gypsum shaft wall enclosures.

D. Division 15 - Plumbing Equipment: Pit sump and pump.

1. Heat and ventilation in Machine Room to maintain the room at a temperature of 60°F minimum and 100°F maximum with humidity not exceeding 95%.

E. Division 16:

1. Empty conduit to elevator equipment devices remote from elevator machine room or hoistway.

2. Electrical characteristics and wiring connections.

3. Electrical service to main disconnect in elevator machine room including electrical power for elevator installation and testing.

4. Electrical service for machine room, machine room convenience outlets, and pit.

5. Lighting and outlet in elevator pit with switch located adjacent to access door or ladder.

6. Empty conduit for telephone service toelevator controller in machine room.

7. Fire Alarm and Smoke Detection Systems: Fire and smoke detectors and interconnecting devices.

8. Shunt trip on "building side" to interrupt power at the elevator disconnect.

9. Fire alarm signal lines to elevator controller cabinet.

10. Fused disconnect or circuit breaker per elevator.

11. Feeder and branch wiring circuits to the controller, including main line switch and convenience outlets.

12. Provide a telephone circuit terminated at each controller. Elevator contractor shall supply and wire telephone cable between controller and car. When separate firefighters' telephones are required, provide as above.

13. Provide a 20A, 120 volt, single-phase protected branch circuit from a normal/emergency power source to the elevator group supervisory panel.

14. Provide circuits to each controller for life safety speakers and firefighters' phone communication, if required. Furnish car speaker and phone jack for mounting and wiring by elevator contractor. Where required by local codes, furnish and install firefighters' phone jacks in a separate fixture at each elevator lobby.

3. REFERENCES

A. AISC - Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.

B. ANSI A117.1 - Buildings and Facilities - Providing Accessibility and Usability for Physically Handicapped People.

C. ANSI/ASME A17.1 - Safety Code for Elevators and Escalators.

D. ANSI/ASME A17.2 - Inspector's Manual For Elevators and Escalators.

E. ASTM A36 - Structural Steel.

F. ASTM A366 - Steel, Sheet, Carbon, Cold-Rolled, Commercial Quality.

G. ANSI/AWS D1.1 - Structural Welding Code, Steel.

H. ANSI/NFPA 70 - National Electrical Code.

I. ANSI/NFPA 80 - Fire Doors and Windows.

J. ANSI/UL 10B - Fire Tests of Door Assemblies.

K. APA - American Plywood Association.

L. ASTM A139 - Electric-Fusion (ARC)-Welded Steel Pipe (NPS 4- in. and Over).

M. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

N. ASTM A446 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.

O. ASTM B221 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.

P. NEMA LD3 - High Pressure Decorative Laminates.

Q. NEMA MG1 - Motors and Generators

R. Steel Structures Painting Council (SSPC) - Steel Structures Painting Manual.

4. SYSTEM DESCRIPTION

A. Hydraulic Elevator System: Holeless unit as standard with specified system with motor and pump and valves in tank with tank heater.

B. Elevators: Characteristics of elevator are as follows:

1. Rated Net Capacity: 2500 lbs.

2. Car Speed: 100 Feet Per Minute

3. Simplex Collective Operation: Using a microprocessor-based controller, operation shall be automatic by means of the car and hall buttons. If all calls in the system have been answered, the car shall park at the last landing served.

4. Number of Stops and Openings: See Drawings

5. Power Supply: Contractor is responsible to verify available power characteristics.

6. Lighting Supply: 120 Volts, 1 Phase, 60 Hertz

7. Cab Platform Size: 6'-8" Wide x 4'- 3" Deep

8. Height Under Suspended Ceiling: 8'-0"

9. Type of Doors for Car and Hoistway Entrances: Center Opening

10. Hoistway Entrance and Car Opening Size: 3'-6" Wide x 7'-0" High

11. Car Operating Panel: One (1) at front

12. Signals: Impulse signal fixtures. Car buttons mounted at 20° angle. Position indicator in car. Illuminated car and hall registration pushbuttons.

C. Hydraulic Elevator System: Motor and pump and valves in tank with tank heater.

D. Special Features as follows:

1. Emergency return unit (automatic return to the ground floor)

2. Variable door times for car and hall calls

3. Limited door reversal

4. Independent Service

5. Nudging

6. Fireman's Emergency Service Phase I and Phase II per ANSI A17.1 with integrated signage

7. Hall lanterns and gongs

8. Solid state (SCR) motor starter

9. Reverse phase relay

10. Car top inspection service with service light

11. Power surge protector so upon elevator start and full running speed there will be no affect on other electrical components of the building.

12. Emergency light with battery and charger in each cab.

13. Emergency power battery as part of elevator system.

14. Full collective operation

E. Door Control Features:

1. A direct current motor driven heavy-duty operator shall be provided, designed to operate the car and hoistway doors simultaneously. Door movements shall be electrically cushioned at both limits of travel and the door operating mechanism shall be arranged for manual operation in event of power failure,. The leading edge of the car door shall be provided with a retractable reversal edge arranged to automatically return car and hoistway doors to the open position in the event doors are obstructed during closing cycle. Doors shall then resume closing cycle.

2. Doors shall automatically open when the car arrives at the landing and shall automatically close after an adjustable time interval or when the car is dispatched to another landing. Direct drive geared operators, AC controlled units with oil checks, or other deviations from the above are not acceptable.

3. The door operator microprocessor shall reside in the door operator and controls all functions of the door. The microprocessor door operator and the microprocessor selector shall be linked to the main processor through a serial communications link.

4. Nudging: The doors shall remain open as long as the electronic detector senses the presence of a passenger or object in the door opening if door movement is obstructed for a field programmable time value, a buzzer shall sound and the doors will close at reduced speed. If the reversing edge contacts a person or object while closing, the doors will stop and resume closing after the obstruction has been removed.

   a. When the doors have failed to fully close and are in the recycle mode, the door drive motor shall have increased torque applied. This shall overcome any mechanical resistance or differential air pressure and allow the door to close.

5. Doors shall open automatically when object present in doorway by means of infrared beam detection system.

F. Interconnect elevator control system with building fire alarm, and smoke alarm.

5. AUTOMATIC OPERATION

A. The elevator control shall be distributed control system, microprocessor based and software oriented. The main microprocessor and car controller shall be located behind the elevator swing return panel. The microprocessor selector, situated on the car top and the microprocessor door operator, residing in the door operator shall be linked together with the main processor by a serial communications link. Control of the elevator shall be automatic in operation by means of push buttons in the car numbered to correspond to floors served, for registering car stops by "up-down" push button at each landing and "call" push buttons at terminal landings.

1. The momentary pressing of one or more buttons shall dispatch the car to the designated landings in the order in which the landings are reached by the car, irrespective of the sequence in which the buttons are pressed. Each landing call shall be canceled when answered. When the car is traveling in the up direction, it shall stop at all floors for which car buttons or "up" hall buttons have been pressed; it shall not stop at floors when "down" buttons only have been pressed, unless the stop for that floor has been registered by a car button, or unless the down call is at the highest floor for which any buttons have been pressed. Likewise, the pressing of an "up" button when the car is traveling in the down direction shall not intercept the travel unless the stop for that floor has been registered by a car button, or unless the up call is the lowest for which any button has been pressed.

B. When the car has responded to its highest or lowest stop, and stops are registered for the opposite direction, its direction of travel shall reverse automatically and it shall then answer the calls registered for that direction.

C. An adjustable time delay shall be provided so that after the car has stopped in response to a hall button, the entering passenger may register his car button before the car will reverse to answer calls in the opposite direction.

D. Key activation to normal operation will return car to normal operation.

6. SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Indicate the following information:

1. Motor and hydraulic pump, valves, controller, selector, governor and other component locations.

2. Car, machine beams, guide rails, buffers, and other components in hoistway.

3. Rail bracket spacing; maximum loads imposed on guide rails requiring load transfer to building structural framing.

4. Individual weight of principal components; load reaction at points of support.
5. Loads on hoisting beams.
6. Clearances and over travel of car.
7. Location of components in machine room.
8. Locations in hoistway and machine room of connections for car light and telephone.
9. Location and sizes of access doors, doors, and frames.
10. Expected heat dissipation of elevator equipment in machine room.
11. Electrical characteristics and connection requirements.
12. Show arrangement of equipment in machine room so moving elements and other equipment can be removed for repairs or replaced without disturbing other components. Arrange equipment for clear passage through access door.

C. Product Data: Provide data on the following items:

1. Signal and operating fixtures, operating panels, indicators.
2. Cab design, dimensions, layout, and components.
3. Cab and hoistway door and frame details.
4. Electrical characteristics and connection requirements.

D. Samples: Submit two samples, 3 x 4 inch in size illustrating cab interior finishes and cab and hoistway door and frame finishes.

E. Certificates and Test Reports:

1. Submit written, certified reports for required tests, recording the dates performed, test method (description), test results, interpretation of the results, and recommended action. Where required, submit additional copies directly to governing authorities.
2. Provide certificates and operating permits to the Owner for each elevator, obtained from governing authorities, as necessary for normal, unrestricted use of the elevators.

7. OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Section 01700.

B. Submit four (4) copies of bound maintenance manuals for each elevator or group of elevators. Include record (as-built) drawings, one-line wiring diagrams for power, lighting, signals, controls and communications, full maintenance and operating instructions, parts lists, recommended spare parts and emergency parts inventory, sources of purchase and similar information. Include engineering data for microprocessor based systems.

C. Diagnostic Test Equipment and Instructions: Diagnostic test device together with one set of all supporting information necessary for interpretation of test data and troubleshooting of system. The instruction period for use of the controller diagnostics and interpretation of test results by Owner's maintenance personnel shall not be less than one eight-hour day for the work included under this section.

D. Include a parts catalog with complete list of equipment replacement parts; identify each entry with equipment description and identifying code.

E. Provide technical information for servicing operating equipment.

F. Include legible schematic of hydraulic piping and wiring diagrams of installed electrical equipment, and changes made in the Work. List symbols corresponding to identity or markings on machine room and hoistway apparatus.

G. Provide one copy of master electric and hydraulic schematic and one copy of lubrication chart, each framed with clear plastic; mount on machine room wall.

H. Provide field adjusting and diagnostic tool required for the microprocessor.

8. QUALITY ASSURANCE

A. Perform Work in accordance with ASME/ANSI A17.1 with latest editions, ANSI/AWS D1.1, NFPA 70, AISC, and as supplemented in this section.

B. Fabricate and install door and frame assemblies in accordance with ANSI/NFPA 80 and ANSI/UL 10B.

9. QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum ten years documented experience.

B. Installer: The elevator installer shall be an authorized licensee of the manufacturer, who has not less than 5 years successful experience with the installation of similar elevators, and who is currently under contract for maintenance of similar elevators in the area, and who maintains a service center within 75 miles of the project site.

10. REGULATORY REQUIREMENTS

A. Conform to applicable code for manufacture and installation of elevator system.

B. Conform to ANSI A117.1 and ADA, whichever is more stringent, for provisions for the physically handicapped, including clearances, control and jamb signage, locations for signal equipment, door timing cycles, and similar provisions.

C. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories, Inc. as suitable for the purpose specified and indicated.

11. PRE-INSTALLATION CONFERENCE

A. Convene one week prior to commencing work of this section; see Section 01200.

B. Require attendance of persons directly involved with the work of this section.

C. Review schedule of installation, installation procedures and conditions, and coordination with related work.

D. Review temporary use of elevator, hours of use, scheduling of its use, cleanliness of cab, employment of operator, maintenance of system

12. FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings and as instructed by the manufacturer.

13. SCHEDULING

A. Schedule work to permit early use of Elevator for construction purposes.

14. WARRANTY

A. Provide written warranty in four copies signed by Installer and Elevator Manufacturer agreeing to replace defective materials or workmanship including, but not limited to the following:

1. Operational failures.

2. Performance below specified minimums.

3. Excessive deterioration or aging.

4. Unsafe conditions.

5. Excessive noise or vibration.

6. Abnormal wear considering intensity of use, unexpected or unsatisfactory conditions.

B. Warranty will not include:

1. Acts of Nature.

2. Abusive use.

3. Vandalism.

4. Failure of the structure.

5. Failure of power supply.

C. Make corrective adjustments or repairs within 24 hours of notification by the Owner.

1. Should such repairs be required outside of normal working hours, Owner will pay differential cost between regular and overtime hours.

D. Warranty Period: One year starting at the date of the Notice of Acceptance of all elevators included under scope of this work.

E. Defective items shall be removed, replaced or repaired without expense to the Owner at the convenience of the Owner. Any damages to the building or any other work resulting from defects in the work of the Contractor's actions in removing, repairing or replacing the defective work shall be the responsibility of the Contractor.

F. The Contractor and Elevator Subcontractor shall jointly guarantee the equipment to perform in complete accordance with the characteristics, rating, capacities, and speeds required by the Contract Documents.

15. MAINTENANCE SERVICE

A. Starting at the date of the Notice of Acceptance, provide complete systematic inspection and maintenance of elevators concurrent with one year new equipment warranty.

1. Furnish trained experts and equipment to check, adjust, lubricate and otherwise maintain the elevators.

2. Repair or replace defective or worn materials or parts except as cause by misuse or abuse by Owner or building occupants.

3. Maintenance period: Twelve (12) months.

B. This service shall include regular examinations of the installation by competent and trained employees of this Subcontractor, and shall include all necessary adjustments, lubrication, cleaning, supplies, and parts to keep the equipment in perfect operation, except such parts made necessary by misuse, accidents, or negligence not caused by this Subcontractor.

C. The Elevator Subcontractor shall have bonafide proven manufacturer's service facilities within 75 miles of the project, which shall be maintained direct by the manufacturer. This Subcontractor shall also have in inventory, within 75 miles of the project, the necessary replacement parts for satisfactory servicing.

D. Make corrective adjustments, repairs within 24 hours of notification by Owner. Should such repairs be required outside of normal working hours, Owner will pay differential cost between regular and overtime.

E. Perform work without removing cars during peak traffic periods.

F. Provide emergency call back service at all hours for this maintenance period within one hour of that call.

G. Maintenance service shall not be assigned or transferred to any agent or Subcontractor without prior written consent of the Owner.

PART 2 - PRODUCTS

16. MANUFACTURERS

A. Drawings and Specifications are based on “Twinpost Telscopic (3 Stage)” by Thyssen Krupp or equal by Otis, Kone, Dover and Schindler.

17. MATERIALS

A. Sheet Steel (Furniture Steel for Exposed Work): Stretcher-leveled, cold-rolled, commercial-quality carbon steel, complying with ASTM A366, matte finish.

B. Sheet Steel (for Unexposed Work): Hot-rolled, commercial-quality, carbon steel, pickled and oiled, complying with ASTM A569.

C. Structural Steel Shapes and Plates: ASTM A6, ASTM A36, ASTM A108.

D. Stainless Steel: Alloy 302 or 304 complying with ASTM A167, with standard temper and hardness required for fabrication, strength and durability.

1. Exposed Surfaces: Apply mechanical finish (Federal Standard and NAAMM nomenclature) on fabricated work in the locations shown or specified, with texture and reflectivity required to match elevator manufacturer's standard #4 satin (120 grit) Protect with adhesive plastic covering. The grain of belting shall be in the direction of the longest dimension.

E. Aluminum: Extrusions per ASTM B221,

F. Paint: Clean all surfaces receiving a baked enamel finish of oil, grease, scale, etc. Apply one coat of rust-resistant alkyd paint followed by a filler coat over uneven surfaces. Sand smooth and apply final coat of alkyd paint. All coats shall be baked on.

1. Clean exposed metal of oil, grease, scale and other foreign matter and factory paint one shop coat of manufacturer's standard rust-resistant primer.

G. Galvanize: Clean metal of oil, grease, scale and other foreign matter, pickle and factory dip all unfinished metal surfaces.

18. PAINT MATERIALS

A. Shop and Touch-Up Primer: SSPC 15, Type 1, red oxide

B. Primer for Wood Surfaces: Alkyd primer sealer.

19. EQUIPMENT

A. Motor, Pumps, Valves, Regulators, Fluid Tank, Hydraulic Fluid, Controller, Controls, Buttons, Wiring and Devices, Indicators: Required by ANSI/NFPA 70.

B. Guide Rails, Cables, Spring Buffers, Attachment Brackets and Anchors: Purpose designed, sized according to code with safety factors.

20. HYDRAULIC DEVICES/PLUNGERS

A. The motor and pump shall be submersed under the oil inside the tank in order to provide for sound isolation. A muffler, designed to reduce pulsation and noise which may be present in the flow of hydraulic oil, shall be provided in the oil line at the top of the pump.

B. Control valves, including safety check valve, up direction valve with high pressure relief including up leveling and soft stop features, lowering valve including down leveling and manual leveling feature, shall be mounted in a compact unit assembly. A valve, designed to shut off the flow of oil between the cylinder and the Power Unit, shall be provided in the oil line in the machine room. Automatic two-way leveling shall be provided to automatically stop and maintain the car approximately level with the landing, regardless of change in load.

C. An up-traveling car shall automatically descend to the lower terminal landing if the hydraulic system does not have a sufficient reservoir of oil. Power operated car and hoistway doors shall automatically open at the lowers terminal landing permitting passenger egress. The doors shall than automatically close and all control buttons, except the Door Open Button in the car operating panel, will be made ineffective.

D. Two accurately ground and polished hydraulic plungers shall be provided. The bottom of each shall be fitted with a positive stop designed to prevent the plungers from leaving their cylinders. The top of each plunger shall be fastened to the car frame. The plungers shall be muti-section telescoping type.

E. Hydraulic jacks shall be designed to stand upright on the pit floor, telescoping type, not requiring a buried casing. Cylinder shall be constructed from heavy steel pipe with a machined steel flange at the upper end and a heavy steel bulkhead at the lower end. Each cylinder shall be connected to the oil line. A packing gland with guide bearing , wiper ring and packing especially designed for hydraulic elevators shall be mounted at the top of each cylinder along with an oil collector ring and drain hole. Each cylinder shall be finished with a coat of rust inhibiting air-dry enamel

21. ELECTRICAL CHARACTERISTICS AND COMPONENTS

A. Electrical Characteristics:

1. Three phase, 60 Hz.; see Division 16 – Electrical

2. Starter Characteristics: Solid State WYE - Delta Starter.

B. Disconnect Switch: Refer to Division 16 for disconnect switch to be installed in control panel.

22. ELECTRICAL COMPONENTS

A. Boxes, Conduit, Wiring, and Devices: Required by ANSI/NFPA 70.

B. Fittings: Steel compression type for electrical metallic tubing. Fittings with set screws are acceptable only when a separate grounding conductor is also installed across the joint.

C. Spare Conductors: Include 10 percent extra conductors and two pairs of shielded communication cables in traveling cables. Do not parallel conductors to increase electric current capacity unless individually fused.

D. Do not use armored flexible metal conduit as a grounding conductor.

E. Include wiring and connections to elevator devices remote from hoistway and between elevator machine rooms. Provide additional components and wiring to suit machine room layout.

23. LUBRICATION

A. Grease Fittings: For lubricating bearings requiring periodic lubrication.

B. Grease Cups: Automatic feed type.

C. Lubrication Points: Visible and easily accessible.

24. CAR FABRICATION

A. Frame: Rigid and braced, rolled or formed steel sections, mounted on resilient isolators.

B. Platform: Steel frame, with fireproofed plywood subflooring assembly, ready to receive floor finish.

25. CAB FABRICATION

A. Flooring: carpet, part of Section 09688.

B. Walls: Removable factory finished plastic laminate finished panels, applied to minimum 16 gauge factory painted stretcher level furniture steel

C. Canopy: Unitized steel construction with emergency exit. Car top shall have service light and duplex 110 volt receptacle.

D. Front Return Panel: Stainless steel.

E. Base: Stainless steel, recessed.

F. Ceiling: Mirror stainless steel laminated panels with 24 low voltage downlights set in frame of extruded aluminum.

G. Ventilation: Two speed fan in ceiling; perforations in base.

H. Operating Device and Face Plate: Satin bronze with illuminating mechanical call buttons with raised markings, car position indicator, in-car direction lanterns and stainless steel telephone cabinet.

I. Indicator Panel: Above control panel with illuminating position indicators.

J. Hand Rail: satin stainless steel flat bar stock 1/4 x 8 inches; placed at side walls.

K. Pad Hooks: Stainless steel type, mounted at standard height, in all cabs.

L. Protective Pads: One set, canvas cover, padded with cotton wadding fill material, sewn with piping edges; brass grommets spaced to match pad hook spacing in cab, covering side and rear walls and front return, except cut-out for control panel.

M. Emergency Car Lighting: An emergency power unit employing a 6 volt, sealed rechargeable battery and totally static circuits shall be provided to illuminate the elevator car and provide current to the alarm bell in the event of building power failure.

N. Emergency Pulsating Siren: Siren mounted on top of the car that is activated when the Alarm button in the car-operating panel is engaged. Siren shall have a rated sound pressure level of 80 dba at a distance of 3.0 m from the device. Siren shall respond with a delay of not more than 1 second after the switch or push button has been pressed.

O. Exhaust Fan: An exhaust fan shall be mounted on the car top

26. CAB ENTRANCES

A. Cab Door Frames: Satin stainless steel 14 gage thick metal, rigid construction.

B. Cab Doors: Satin stainless steel 16 gage thick metal, of hollow, flush design, rigid construction. Fabricate front return panels same as doors.

C. Thresholds: Satin aluminum.

27. HOISTWAY ENTRANCES

A. Hoistway Doors: Stainless steel; 16 gage thick metal, of hollow sandwich panel construction, flush design, rigid construction.

B. Hoistway Door Frames: Stainless steel; 14 gage thick metal, of rolled profiles, bolted construction.

C. Door and Frame Construction: UL 1-1/2 hour fire rating; insulated sandwich panel door construction 1- 1/4 inch thick, minimum.

D. Sills: Satin aluminum.

E. Entrance Finish: Powder painted. Color to be selected from the manufacturer's standard color chart.

F. Entrance Markings: Entrance jambs shall be marked with 4" x 4" (102 mm x 102 mm) plates having raised floor markings with Braille adjacent. Markings shall be provided on both sides of the entrance.

G. Fire Rating: Entrance and doors shall be UL fire rated for 1-1/2 hour

28. FINISHES

A. Structural Metal Surfaces: Clean surfaces of rust, oil or grease; wipe clean with solvent; prime two coats.

B. Machine Room Components: Clean and degrease; prime one coat, finish with one coat of enamel.

C. Galvanized Surfaces: Clean with neutralizing solvent; prime one coat.

D. Aluminum: Clear anodized finish.

E. Wood Surfaces not Exposed to Public View: One coat primer; one coat enamel.

F. Stainless Steel: No. 4 brushed.

G. Entrance Doors and Frames: Baked enamel paint finish of color selected by the

Architect.

29. CAR OPERATING PANEL

A. Applied car operating panel shall be furnished. It shall contain a bank of round mechanical illuminated buttons. Flush mounted to the panel and marked to correspond to the landings served, an emergency call button, door open and door close buttons, and switches for lights, inspection and the exhaust fan. The emergency call button shall be connected to a bell that serves as an emergency signal. All buttons to have raised numerals and Braille markings. Red LED halo illumination with 1/8" projecting targets. Target Finishes: Satin Stainless Steel.

B. Position alarm button where it is unlikely to be accidentally actuated; not more than 35 inches above cab floor.

C. Include services integral with front return panel and containing:

1. Independent service switch.

2. Fan or blower switch.

3. Light switch.

4. Telephone cabinet and telephone (coordinate with Owner).

5. Additional operating switches for the special features specified.

D. Car Position Indicators: A digital, LED car position indicator shall be integral to the car operating panel.

E. Emergency Light: Internal above car position indicator.

F. Telephone Cabinet: Below car station. A hands free telephone shall be provided which is designed in response to ADAAG requirements integral with the car operating panel

30. LANDING CONTROLS

A. Hall Buttons: Vandal resistant illuminated type at each landing entrance for each elevator, one for originating UP and one for originating DOWN calls, one button only at terminating landings; including indications required by ANSI A117.1 and ADA. Combine unit in face plate of position indicator.

B. Finish: Stainless steel at all hall signal fixtures.

31. PROVISION FOR HANDICAPPED

A. Comply with ANSI A117.1 and ADA.

B. Provide indicators near controls in conformance with ANSI A117.1 and ADA.

C. Locate highest button in elevator cab control panel and the center of the telephone handset, not more than 54 inches above floor level.

D. Sound audible tone signal in car when car is stopping at a floor .

E. Include with illuminated landing indicators, audible tone signals; once for UP stops and twice for DOWN stops.

F. In each cab provide Arabic numerals 5/8 inch in height raised 0.03 inch Braille numerals immediately to left of floor buttons to identify each floor.

G. At each floor landing provide 2 inch floor numerals raised 0.03 inch on door frame jamb.

32. NOISE CONTROL AND VIBRATION ISOLATION

A. If pump is V-belt type, provide sound insulating panels, 16 ga. steel with 1" thick 1.5 pcf core of fiberglass , mounted on all open sides of the power unit frame.

B. Provide minimum of 2 sound isolation couplings in oil line in the machine room between pump and jack.

C. Install oil-hydraulic silencer (muffler) with pulsation absorbing material in a blowout proof housing in the oil line near power unit. Unit shall be designed for inspection of interior parts without removing from oil line. Rubber hose without blowout features will not be acceptable.

D. Mount open steel spring with neoprene vibration isolators under power unit baseplate assembly. Provide 1" static deflection.

E. Provide 36 inch long flexible electrical connections.

F. Hydraulic piping shall be vibration isolated from the building structure for it's entire run, including all supports points as well as every penetration of the building construction.

PART 3 - EXECUTION

33. EXAMINATION

A. Verify that hoistway, pit, and machine room are ready for work of this section.

B. Verify hoistway shaft and openings are of correct size and within tolerance.

C. Verify that electrical power is available and of the correct characteristics.

34. INSTALLATION

A. Install in accordance with ANSI/ASME A17.1.

B. Install system components. Connect equipment to building utilities. Install piping between hoistway plunger and pump unit.

C. Provide conduit, boxes, wiring, and accessories.

D. Mount motor and pump unit on vibration and acoustic isolators, on bed plate and concrete pad.

E. Accommodate equipment in space indicated.

F. Install guide rails using threaded bolts with metal shims and lock washers under nuts. Compensate for expansion and contraction movement of guide rails.

G. Accurately machine and align guide rails. Form smooth joints with machined splice plates.

H. Bolt or weld brackets directly to structural steel hoistway framing.

I. Field Welds: Chip and clean away oxidation and residue, wire brush; spot prime with two coats.

J. Coordinate installation of hoistway wall construction.

K. Install hoistway door sills, frames, and headers in hoistway walls. Grout sills in place. Set entrances in vertical alignment with car openings and aligned with plumb hoistway lines.

L. Adjust equipment for smooth and quiet operation.

35. TOLERANCES

A. Guide Rail Alignment: Plumb and parallel to each other within 1/16 inch in accordance with ANSI/ASME A17.1 and ANSI/ASME A17.2.

B. Cab Movement on Aligned Guide Rails: Smooth movement, with no objectionable lateral or oscillating movement or vibration.

36. FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 01400.

B. Upon nominal completion of each elevator installation, and before permitting use of the elevator (either temporary or permanent), perform acceptance t4sts as required by governing regulations. Comply with ASME A17.2, Part II, "Standard Practices for the Inspection of Elevators".

C. Provide two (2) weeks written notice of date and time of tests.

D. Supply instruments and execute specific tests.

E. Perform the following tests in the presence of the Owner and Architect:

1. Test elevator system by transporting at least 6 persons up from main floor during a five minute period.

2. Time elevator travel between typical floors to compare to rated speed. Measure time from moment doors start to close until car has stopped level at next floor and doors are opening.

3. Stopping accuracy.

4. Operation of signal fixtures and supervisory system.

F. Instruct the Owner's personnel in the proper use, operation and daily maintenance of the elevator. Review emergency provisions, including emergency access and procedures to be followed at a time of failure in operation and other building emergencies. Train Owner's personnel in the normal procedures to be followed in checking for the source of an operational failure or malfunction. Confer with the Owner on the requirements for a complete elevator maintenance program.

G. Make a final check of each elevator operation just prior to acceptance of the elevator work by the Owner. Determine that all operating devices are functioning properly.

37. PERFORMANCE

A. Contract Speed: Actual speed shall vary no more than ±3% for speed specified under any loading condition or direction of travel.

B. Levelling Accuracy: Cars shall level consistently within ±1/4" under loading conditions.

C. Door Times as follows:

1. The door-opening time, measured from the instant the doors start to open until within 1" of the fully open position, shall not exceed 1.7 seconds for 42" single speed center opening doors.

2. The door closing time shall comply with ASME A17.1 and local codes.

3. Long door and short door "hold open" times shall be set at 4.0 and 2.5 seconds respectively unless directed otherwise. The door close pressure shall be set per code requirements.

D. Door Nudging Time: The time from when the door is blocked until nudging feature starts shall comply with ASME A17.1 and local codes and shall not be less than 20 seconds.

38. TESTS BY REGULATORY AGENCIES

A. Testing by regulatory agencies will be performed at their discretion; documented by the Contractor.

B. Obtain required permits to perform tests. Perform tests required by regulatory agencies.

C. Schedule tests with agencies with Architect and Contractor present.

D. Furnish test and approval certificates issued by jurisdictional authorities.

39. ADJUSTING

A. Adjust work under provisions of Section 01700.

B. Adjust for smooth acceleration and deceleration of car so not to cause passenger discomfort.

C. Adjust automatic floor levelling feature at each floor to achieve 1/4 inch from flush.

40. CLEANING

A. Clean work under provisions of 01700.

B. Remove protective coverings from finished surfaces.

C. Clean surfaces and components ready for inspection.

41. PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Section 01500.

B. Do not permit construction traffic within cab after cleaning.

END OF SECTION

SECTION 14310 – ESCALATORS

S-065 Escalators

PART 1 - GENERAL

1. SECTION INCLUDES

A. Cleat step reversible type escalator, capable of operating under full load, as defined in the "Code", for ascending or descending passenger service, and arranged to operate on an incline of 30 degrees from the horizontal. The escalator shall be designed to operate quietly and smoothly.

B. Single-speed self-contained unit consisting of truss, tracks, drive unit, step, step chain, comb plates, handrails, handrail drive, controller, safety devices, inside balustrade, decks, skirt, and all other parts required to provide a complete operating escalator.

C. The Contractor is responsible to assure his equipment will operate satisfactorily within the specified conditions. If modifications are required, it shall be the Contractor's responsibility to make any necessary changes as needed.

1. Should any equipment be furnished that will not properly function within the specified parameters, it shall be the Contractor's responsibility to pay any additional costs attributable to providing the correct equipment.

D. The escalator supplier must provide a priced spare parts list with prices good for at least three (3) years and indicate availability spare parts.

E. The diagnostic equipment must be supplied with the escalator to the Owner.

2. RELATED SECTIONS

A. The following items are to be provided under other sections of these specifications:

1. Electric connections from the power mains to the circuit breaker in the machine room including wiring, receptacles and outlets for illumination of interior or truss and machine room, and wiring to supplementary emergency stop button, if used. Also, whatever cutouts, circuit breakers, lightning arresters or other devices are necessary to meet local requirements.

2. Electrical Division 16 will terminate power supply, and feeders with fused disconnect switch, at the top end of the truss.

3. Escalator supports including intermediate as well as top and bottom supports.

4. Adequate drainage for escalator pits at ground level or below.

5. Guards for protection against exposure to pinching and shear hazards.

3. REFERENCES

A. AISC - Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.

B. ANSI A117.1 - Buildings and Facilities - Providing Accessibility and Usability for Physically Handicapped People.

C. ANSI/ASME A17.1 - Safety Code for Elevators and Escalators.

D. ANSI/ASME A17.2 - Inspector's Manual For Elevators and Escalators.

E. ASTM A36 - Structural Steel.

F. ASTM A366 - Steel, Sheet, Carbon, Cold-Rolled, Commercial Quality.

G. ANSI/AWS D1.1 - Structural Welding Code, Steel.

H. ANSI/NFPA 70 - National Electrical Code.

I. ASTM A139 - Electric-Fusion (ARC)-Welded Steel Pipe (NPS 4- in. and Over).

J. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

K. ASTM A446 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.

L. ASTM B221 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.

M. NEMA MG1 - Motors and Generators

N. Steel Structures Painting Council (SSPC) - Steel Structures Painting Manual.

4. SYSTEM DESCRIPTION

A. Type: The escalator shall be of the Cleated Riser, Reversible type for ascending and descending passenger service. It shall operate on an incline of 30 degrees from the horizontal. Each escalator shall be furnished and erected in accordance with the following details:

1. Width: 40” step width unit, see Drawings.

2. Rated Capacity: 6,000 person per hour.

3. Speed: The escalator steps shall travel at a speed of 100 lineal feet per minute, with a constant potential at the controller of 480 volts, 3 phase, AC.

B. Safety Features: As follows:

1. Emergency Stop Button

2. Broken Stepchain Switch

3. Broken Drive Chain Switch

4. Brake

5. Step Upthrust Switch

6. Under/Over Speed Switch

7. Step Demarcation Lights

8. Handrail Guard Switch

9. Handrail Speed Switch

10. Skirt Switches

11. Broken Step Switch

12. Yellow Step Inserts on Three Sides

13. Emergency “Stop” push button device accessible to the public

14. Level Steps: 3

5. SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Indicate the following information:

1. Typical details of assembly, erection and anchorage drawn at large scale.

2. Overall plans, elevations, and sections to show the floors served, travel distances (horizontal and vertical) and similar considerations of the work.

3. Include wiring diagrams for the entire system of power distribution, control, and signals.

4. Coordination requirements of balustrades and floor plates with other work.

5. Access and ventilation requirements (if any).

C. Product Data: Provide data on the following items:

1. Design, dimensions, layout, and components.

2. Electrical characteristics and connection requirements.

D. Samples: Submit two samples, 3 x 4 inch in size illustrating all finishes.

6. OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Section 01700.

B. Include a parts catalog with complete list of equipment replacement parts; identify each entry with equipment description and identifying code.

C. Provide technical information for servicing operating equipment.

D. Include legible schematic of piping and wiring diagrams of installed electrical equipment, and changes made in the Work. List symbols corresponding to identity or markings on machine room and hoistway apparatus.

E. Provide one copy of master electric and one copy of lubrication chart, each framed with clear plastic; mount on machine room wall.

F. Provide field adjusting and diagnostic tool required for the microprocessor.

7. QUALITY ASSURANCE

A. Perform Work in accordance with ASME/ANSI A17.1 with latest editions, ANSI/AWS D1.1, NFPA 70, AISC, National Electric Code, and as supplemented in this section.

8. QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum ten years documented experience.

B. Installer: Employees and supervisor on payroll of escalator equipment manufacturer or a franchised company of that manufacturer which specializes in performing the work of this section.

C. Supplies: Coils, contacts, rectifiers, broken chain switch, comb plates, 4 complete step units, 24 step and chain rollers, key switch, 2 complete stop buttons shall be warehoused and available within 90 miles of the project site. The Owner reserves the right to visit the warehouse and confirm the availability of these components.

9. REGULATORY REQUIREMENTS

A. Conform to applicable code for manufacture and installation of escalator system.

B. Conform to ANSI A117.1 and ADA, whichever is more stringent, for provisions for the physically handicapped.

C. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories, Inc. as suitable for the purpose specified and indicated.

10. PRE-INSTALLATION CONFERENCE

A. Convene one week prior to commencing work of this section; see Section 01200.

B. Require attendance of persons directly involved with the work of this section.

C. Review schedule of installation, installation procedures and conditions, and coordination with related work.

11. FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings and as instructed by the manufacturer.

12. WARRANTY

A. The Contractor and Escalator Subcontractor shall jointly warrant that the materials and workmanship shall be first-class in every respect and that defects not due to ordinary wear and tear occurring within one (1) years from the date of acceptance shall be corrected.

B. Defective items shall be removed, replaced or repaired without expense to the Owner at the convenience of the Owner. Any damages to the building or any other work resulting from defects in the work of the Contractor’s actions in removing, repairing or replacing the defective work shall be the responsibility of the Contractor.

C. The Contractor and Escalator Subcontractor shall jointly guarantee the equipment to perform in complete accordance with the characteristics, rating, capacities, and speeds required by the Contract Documents.

13. MAINTENANCE SERVICE

A. Furnish service and maintenance of escalator system and components for twelve (12) months from date of Substantial Completion.

B. Examine system components bi-monthly. Clean, adjust, and lubricate equipment.

C. Include systematic examination, adjustment, and lubrication of equipment;

maintain hydraulic fluid levels. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original equipment.

D. Provide emergency call back service at all hours for this maintenance period within one hour of that call.

E. Maintain locally, near the place of the Work, an adequate stock of parts for replacement or emergency purposes. Have personnel available to ensure the fulfillment of this maintenance service, without unreasonable loss of time.

F. Perform maintenance work using competent and qualified personnel, under the supervision of the escalator manufacturer or original installer.

G. Maintenance service shall not be assigned or transferred to any agent or Subcontractor without prior written consent of the Owner.

PART 2 - PRODUCTS

14. MANUFACTURERS

A. "Model Eco 3000 series" by Kone or equal by ThyssenKrupp, Schindler and Otis Elevators.

15. DRIVE MACHINE

A. The machine shall be geared type. The gear members shall be of steel and special bronze. The thrust shall be taken up by ball bearings. The warm and pinion shall be provided with roller bearings having ample bearing surfaces and shall run in oil in an oil-tight housing. The machine shall be mounted within the truss and connected by chain to the main drive shaft of the escalator.

16. BALUSTRADES

A. The balustrades shall be of type indicated and shall be of the following materials:

1. Mouldings: Type 304 Stainless Steel with No. 4 satin finish.

2. Deck Covers: Type 304 Stainless Steel with No. 4 satin finish.

3. Handrail Panels: 3/8" thick Type 304 Stainless Steel panel with No. 8 mirror finish on both sides.

4. Inner Panels: 3/8" clear tempered glass.

5. Skirt Panels: Type 304 Stainless steel with No. 4 satin finish.

6. All joints between escalators shall match without requiring fillers.

17. MOTOR AND CONTROLLER

A. The integrally mounted, ball bearing motor shall be designed and manufactured for use with escalators and shall develop adequate starting torque.

B. The controller shall be of the electro-magnetic type for use with escalators. The controller shall contain electromagnetic, switches mounted on a panel supported by a metal frame. It shall be designed to control the motor, to shut off the current automatically and to bring the escalator to rest in the event of the operation of any of the safety devices. A service switch of circuit breaker type with overload device shall be provided at the top end of the truss. Provide all wiring materials from the top of the truss to the motors in each module furnished.

18. OPERATING DEVICE

A. At the upper and lower landing newels, a fixture shall be mounted which includes a momentary pressure emergency-stop button and a key actuated direction switch. This switch shall start or reverse the direction of travel of the escalator. A float switch with a signal light and alarm shall be installed at the lower end of each escalator pit that is located at ground level or below. The light and alarm will be activated when 4" of water has accumulated in the pit and the escalator will stop when the water level reaches 8".

19. HANDRAILS

A. Handrails constructed of synthetic rubber-covered canvas, suitably reinforced and made endless with smoothly vulcanized joints, shall be provided to operate with the moving steps. The handrails shall run on specially formed guides. Safety guards shall be provided where the handrails enter and leave the escalator newels. Handrails shall be ebony color.

20. HANDRAIL DRIVE

A. The handrail drive shall consist of drive rollers to engage the inner and outer surface of the handrail. The handrail shall derive its motion from the drive unit assembly, and shall be synchronized with the steps.

21. BROKEN-CHAIN SAFETY DEVICE

A. The broken-chain safety device shall be incorporated as part of the tension carriage and shall be provided with safety switches, one for each chain, to cut off the current and bring the escalator to rest, should either chain break. These safety switches, located in the lower truss and easily accessible, shall also stop the escalator should the tension on either chain drop below or exceed a predetermined value.

B. If the drive-chain connected to the main drive shaft should part, an emergency brake of the wedge disc type, mounted integrally with the sprocket drive unit, shall bring the escalator to a gradual stop.

22. STEP AND SKIRT SAFETY DEVICE

A. A step and skirt safety device shall be provided at the lower landing. This device shall comprise three switches located on each side of the escalator. One switch shall be mounted in the skirt panel approximately 16" from the comb plate tip and the other two on the track system at the lower landing curve. The escalator shall stop, should any of these switches be tripped. The switches are of the self-resetting type but if, for any reason, re-setting is prevented after tripping, it shall be impossible to start the escalator by the starting switch until the obstructing medium is removed and re-setting of the switch is permitted.

23. NON-REVERSING DEVICE

A. The non-reversing device shall be designed to stop the escalator should the direction of travel be accidentally reversed while the escalator is operating in the ascending direction.

24. BRAKE

A. The escalator machine shall be provided with an electro mechanical brake designed to bring the escalator to a gradual stop whenever the power is interrupted, a stop button is pressed or any of the safety devices operated.

25. TRUSS

A. The structural steel truss shall be of the lattice-type construction for easy inspection of the interior of the escalator. The truss shall have a factor of safety as prescribed by ANSI A17.1 - The American National Standard Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks. It shall be constructed for rigidity and be of ample strength to carry the passenger capacity load and mechanism of the escalator, the balustrades and the weight of exterior covering of material of equal weight to plaster. The drive machine can be located in the truss or at the upper end and it will be the responsibility of this division to make arrangements and furnish the access doors. Where the escalator rise exceeds the limits of the designed unit or there are not sufficient intermediate supports, the escalator contractor shall provide the additional support required by their truss design.

26. LUBRICATION

A. Effective means shall be provided for lubricating the bearings efficiently and economically. Drip pans shall be provided for the entire length of the escalator truss of sufficient rigidity to support weight of concrete.

27. STEP

A. The steps shall be constructed of die cast aluminum alloy to insure high load carrying capacity and long life.

B. The step rollers, with sound reducing tires, shall be designed for quiet operation and easy removal and provided with suitable and-friction bearings for smooth, low friction operation.

C. Step Demarcation Lights: Green step demarcation lights located below the step shall be provided at both landings in an area not to exceed sixteen (16) inches from comb plate. There shall be a minimum of two (2) fluorescent lamp fixtures at each landing.

28. STEP TREADS

A. The step treads shall be die-cast aluminum with closely spaced cleats designed to provide a secure foothold and comfortable standing surface, especially for narrow heels, and to provide wearing surfaces for long life. Step risers shall include vertical cleats designed to pass between the cleat of the tread on the adjacent steps, thus providing a combing action with minimum clearances. The tread and risers shall be anti-step construction.

B. The escalator will have three (3) flat steps at each end. The number of exposed step treadboards (flat steps) at the top and bottom landings shall be measured from the comb fingers, in a horizontal direction to the first 1/2" (12.7mm) exposure of a step riser.

29. COMB PLATES

A. A comb plate of the section type shall be located at the top and bottom landings designed to properly mesh with the cleats on the step treads. It shall be made in sections so that a section can be readily replaced without the use of special tools.

30. GUARDS AND SIGNS

A. All signs and guards including pinch guards shall be furnished in place before acceptance, signs shall be bilingual (English and Spanish) and attached at top and bottom of each unit.

31. FLOOR PLATES

A. Structural extruded aluminum floor plates and the hinged trap door over the machine shall be provided, with matching extruded aluminum floor plates to match the comb plates. Landing plates shall be provided to match comb plates. When the trap door to the upper section of the truss is open, the door shall be held open by a steel rod.

32. WATER IN PIT SIGNAL

A. A water in pit signal shall be provided, by the escalator contractor in every escalator pit at first level. Provide two normally closed auxiliary contacts in the

control circuits of the water in the pit signal.

33. ELECTRICAL CHARACTERISTICS AND COMPONENTS

A. Electrical Characteristics:

1. Three phase, 60 Hz.; see Division 16 – Electrical

2. Starter Characteristics: Solid State WYE - Delta Starter.

PART 3 - EXECUTION

34. EXAMINATION

A. Wellway Construction: The Installer must examine the wellways to receive escalators, including supporting structure and machine spaces and the conditions under which the work is to be installed. Verify dimensions of wellway before fabricating the work. Notify the Contractor in writing of dimensional discrepancies and other conditions detrimental to the proper performance of the escalator work. Do not proceed with installations until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

B. Coordination: Coordinate escalator work with the work of other trades, for proper time and sequence to avoid construction delays. Use benchmarks, lines and levels designated by the Contractor, to ensure dimensional coordination of the work.

C. Verify that electrical power is available and of the correct characteristics.

35. INSTALLATION

A. Install in accordance with ANSI/ASME A17.1 and manufacturers printed instructions, and the National Electric Code.

B. Install system components. Connect equipment to building utilities.

C. Provide conduit, boxes, wiring, and accessories.

D. Accommodate equipment in space indicated.

E. Set escalator units true to line and level, properly supported and anchored to the building structure.

F. Adjust installed components for smooth, efficient operation, complying with required tolerances and free of hazardous conditions. Lubricate operating parts including bearings, tracks, chains, guides and hardware. Test operate devices, equipment, signals and controls; comply with Code.

36. INSTRUCTION

A. Instruct the Owner's personnel verbally and in writing in the proper use, operation and daily maintenance of the escalators. Review emergency provisions, including access and procedures to be followed in checking for the source of an operational failure or malfunction. Confer with the Owner on the requirements for a complete escalator maintenance program.

B. Manuals and Wiring Diagrams: This Division shall furnish the following:

1. Two sets of as built wiring diagrams

2. Two copies of parts leaflets

3. Two copies of maintenance instructions for preserving he escalator decks, steps and other finishes.

37. ACOUSTICAL PERFORMANCE

A. Noise from operating escalators shall not exceed 65 dBA when measured 60" above the moving steps. Prior to installation the manufacturer shall submit to the architect, test data measured on models similar to those proposed for use in this project. A description of the test surrounding environment (geometry of the space, materials, etc.) shall accompany the submission. The manufacturer shall become familiar with the installation conditions for this project and verify through calculations that the noise limit will not be exceeded. Test data measured on the installed shall be submitted prior to receiving final acceptance. If necessary, corrective action shall be taken by the manufacturer.

B. Noise measurements shall be made by observing upward excursion on a sound level meter held at the specified distance from the steps while riding the escalator from one end to the other. The A-weighting network and the "slow" meter response shall be employed for the measurements.

C. A sound level meter reading the type 1 requirements of the American National Standard Specification for sound level meters shall be used for all tests. An acoustic calibrator accurate to +/- .05 decibels shall be used for verifying amplifier gain and absolute sound level indication of the sound level meter immediately prior to and following the measurements.

38. FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 01400.

B. Perform tests required by ANSI/ASME A17.1 and A17.2 and governing regulatory agencies.

C. Provide two (2) weeks written notice of date and time of tests.

D. Supply instruments and execute specific tests.

39. TESTS BY REGULATORY AGENCIES

A. Testing by regulatory agencies will be performed at their discretion; documented by the Contractor.

B. Obtain required permits to perform tests. Perform tests required by regulatory agencies.

C. Schedule tests with agencies with Architect and Contractor present.

D. Furnish test and approval certificates issued by jurisdictional authorities.

40. CLEANING

A. Remove protective coverings from finished surfaces.

B. Clean surfaces and components ready for inspection.

41. PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Section 01500.

B. Do not permit construction traffic on escalator after cleaning.

END OF SECTION

SECTION 15050 - BASIC MATERIALS AND METHODS

PART 1 – GENERAL

1. RELATED DOCUMENTS

A. The General Provisions of the Contract, including General and Supplementary Conditions and General Requirements apply to the work specified in this Section.

B. Separation of specifications into sections is for convenience only and is not intended to establish limits of work or liability. The following are the Sections that will apply to this project.

15050 - Basic Materials and Methods
15250 - Piping and Equipment Insulation
15400 – Plumbing
15500 - Fire Protection System
15550 - Clean-Agent Fire Suppression System
15800 - Heating, Ventilation and Air Conditioning
15850 - Testing, Adjusting, and Balancing of Air and Hydronic Distribution Systems
15900 - Valves, Strainers, Unions and Fittings
15950 - Building Automation System

2. DESCRIPTION OF WORK

A. The work to be done under this heading includes the furnishing of labor, materials, equipment, and service necessary for and reasonably incidental to the proper completion of all mechanical work as shown on the drawings and herein specified.

B. Visit and examine the job site, and with all authorities concerned in order to become familiar with all existing conditions pertinent to the work to be performed thereon. No additional compensation will be allowed for failure to be so informed.

C. Pay all costs and fees for utility connections.

D. Materials and equipment shall be new, except where otherwise indicated, of the best quality, with same brand of manufacturer for all similar material.

E. All work shall be performed in a neat and workmanlike manner, and in accordance with all codes, standards, and requirements of the industry.

F. In general, provide the installation of plumbing, heating, air conditioning, and ventilating systems, complete with all piping, fittings, fixtures, equipment, etc.

G. Regardless of titles and subdivisions herein employed, consider these specifications as one complete document with General Section applying to all other sections. All bidders are cautioned to read entire specifications and to thoroughly familiarize themselves with all requirements thereof.

H. Check all specifications and all drawings and, prior to bid, bring to attention any conflicts or variations as shown as noted.

I. Specifications and accompanying drawings apply to all contracts or sub-contracts entered into for supplying material or labor for construction of work specified herein and shown on drawings.

J. Protect Owner and his agents including Construction Manager, Architect and/or Engineer from any and all damages and expense arising from fulfillment of contract and at completion of work repair all damages done.

K. For any points which are not clear, or for items and/or details which the Contractor feels are in need of clarification, consult the Architect before submission of a proposal.

L. The drawings and the specifications are complementary and what is shown and/or called for on one shall be furnished and installed the same as if shown and/or called for in the other.

M. In case of discrepancies and/or ambiguities in the drawings and/or in the specifications, the Architect shall be consulted prior to submission of a proposal. Failure to do so on the part of the successful bidder shall be construed as explicit agreement on his part to abide by the Architect's decision in such matters.

N. The word "provide" as used in these Specifications and on the Drawings shall be termed to mean "furnish and install".

O. Contractor shall include in base bid the connection of all sewer, and water piping to mains as shown on the drawings. Contractor shall include all material and all costs for complete installation.

P. If the Contractor notices during the bidding any items of the contract documents which will violate any applicable code, these items shall be brought to the attention of the Architect before the bid date. Failure to bring these items to the attention of the Architect shall be construed as explicit agreement that the Contractor has included in his bid price any and all modifications necessary to complete the project in accordance with all applicable codes.

Q. Contractor shall provide all seismic restraints and supports for all new mechanical systems as here-in-after specified and as required by IBC 2006.

3. RELATED WORK SPECIFIED IN OTHER SECTIONS

A. All exposed piping, ductwork and other equipment shall have all the surfaces clean of oil, dirt, plaster, etc. All surfaces and items to be painted will be painted under the Painting Section.

B. Power wiring for all equipment shall be done under ELECTRICAL SECTION.

C. Provide approved wiring diagrams to the Electrical Contractor showing interlocking of all equipment and controls, assisting in all wiring problems affecting his equipment, checking and verifying that same is wired correctly under the Electrical Section for proper operating of all mechanical items.

D. Provide under this section all heating, air conditioning, ventilating and other mechanical systems controls, starters, firestats, relays, and related equipment.

E. Openings for all access doors, relief and return air grilles, etc., shall be provided under the respective trade sections.

F. Curbs, flashings, etc., for exhaust fans, vents, etc., shall be provided under the respective sections.

G. All HVAC control wiring shall be furnished and installed under this Section of the Specifications.

H. Piping penetrations through fire rated partitions/floors shall be fire sealed in accordance with the UL fire resistance directory. See Sealant Specification for materials.

4. QUALITY ASSURANCE

A. The Contractor bidding on this portion of the work must be fully experienced in installations of equal size, complexity, and quality, and must be licensed to perform such work as required by the Louisiana State Legislature, R.S.37:2152-2163.

B. In bidding he acknowledges that he fully understands the scope of work and design, and has the ability for the contract price to assemble and install the equipment, piping and ductwork shown or specified, so as to mold same into a satisfactory workable system and arrangement.

C. Contractor shall recognize that a fault or error in his work remains his responsibility regardless of whether such difficulty was discovered after the work had progressed, and shall make corrections at no cost to the Owner.

D. Adequate and competent constant supervision shall be provided by Contractor to assure that work is done in accordance with good standard practice and workmanship and with intent of drawings and specifications. Contractor shall recognize that amount of information and detail could be provided to contract documents is limitless and could extend into every minute detail and sequence of operations, to a point where only workmen would be required, without drawing on ability, experience and ingenuity of the Contractor.

E. All work shall be installed in strict accordance, with all existing local and state codes and ordinances, and with National Board of Fire Underwriters

F. This Contractor shall secure all permits and inspections and shall pay all fees and taxes and shall provide Owner with certificates of approval from agencies having jurisdiction over various phases of work.

5. SUBMITTALS

A. Shop Drawings and Submittal Data required:

1. Submit to the Architect for review and approval, complete descriptive information and dimensional data on all items of equipment, materials and accessories, including duct, and equipment layouts. Piecemeal submissions shall not be approved. Written approval thereof must be obtained before ordering, fabrication or installation. The following shall be submitted:

Exhaust Fans	Ductwork Layout
Air Handling Units	Equipment Layout
Insulation	Diffusers, Grilles & Registers
Water Heater	Plumbing Fixtures
Valves, Strainers, Unions & Fittings	All Mechanical Room Layouts
Temperature Control System	Pumps
Sprinkler Shop Drawings and Calculations	Air cooled Chillers
Hydronic Accessories	

2. Shop drawings and submittal data shall be considered to be instruments of service only and submitted for the sole purpose of convenience to the Contractor to assist him in the performance of the contract. The Architect's review of the shop drawings and submittal data shall not supersede these specifications, the accompanying drawings, or the contract terms, unless specifically covered by a properly executed change order, and then only to the extent specifically and explicitly stipulated therein.

3. Submit in accordance with requirements of Architectural Sections, Division 1.

B. After completion of project Contractor shall turn over to the Architect complete operating and maintenance instructions including listing of supply and repair items

and locations of places to purchase same. Comply with requirements of Division 1 Sections.

C. Substitutions:

1. All material, equipment, methods, and accessories entering into the work under this section of contract are subject to approval or disapproval of the Architect. Approval of any manufacturer, material, or product shall not constitute a waiver of Architect's right to demand full compliance with contract requirements, including shape, size, quality and performance.

2. Equality of materials is that established by opinion of Architect. Decision of Architect is final.

3. Whenever a material or article of equipment is specified by use of a proprietary name, or by naming the manufacturer or vendor, any material or article which will perform adequately the duties imposed by the design will be considered for substitution, providing it is of equal substance, and function, meets specifications, and is aesthetically acceptable to the Architect. Refer to Division 1 Sections for approval procedures.

4. Literature, technical data, etc., includes complete data and samples if necessary, with submissions for substitutions. Burden of proof that material offered for substitution is equal, or superior, in construction and efficiency to that named, rests on Contractor, and unless proof is satisfactory to Architect, substitution will not be approved.

5. REFER TO APPENDIX #1 FOR LISTING OF ADDITIONAL PRIOR APPROVED MECHANICAL AND PLUMBING, EQUIPMENT AND APPURTANCES.

D. Refer to Division 1 Sections for "As-Built" requirements.

6. PRODUCT DELIVERY, STORAGE AND HANDLING

Take necessary precautions to protect all material, equipment, apparatus and work from damage. Failure to do so to the satisfaction of the Architect will be sufficient cause for the rejection of the material, equipment or work in question. Contractor is responsible for the safety and good condition of the materials installed until final acceptance by the Owner.

7. JOB CONDITIONS

A. Accompanying drawings, including plans, details, diagrams, notes, etc., are shown to limit and explain structural conditions, construction requirements, sizes, capacities and method of installation and erection. Structural and other conditions

may require certain modifications and adjustments from conditions shown. Such deviations are permissible; however, specific sizes capacities and requirements affecting the satisfactory performance and operation of the installation shall remain unchanged. Make allowance in bid price for job conditions and interferences.

B. Whenever it becomes necessary to shift ducts or pipes or to change shape of ducts, such changes shall be referred to Architect for approval.

C. Ask for details whenever uncertain about method of installation. Lack of details not requested shall not excuse improper installation and correction shall be responsibility of Contractor.

D. Furnish detailed duct layout and equipment room shop drawings based on field measurements and actual job conditions.

E. Schedule and perform all mechanical work to avoid delays to the Contractor and other trades.

F. In addition to the basic work covered under this contract, the Contractor shall plan and schedule the work to permit continuous operation of essential services of existing facilities. Planning shall also include scheduling necessary interruptions of service on water lines, drain lines, etc., to existing building at times when such interruptions will cause minimum interference with existing routine and services. All such interruptions shall be made only after consultation with the Owner. This is extremely important since included in the work is a relocation and rerouting of and connecting to existing facilities, piping, etc. No additional compensation will be allowed for failure to be so informed.

G. It is essential that all adjacent buildings be kept in operation at all times, except when specific permission is given to contrary. Before any lines or equipment are shut down for disconnecting, tie-ins, or rearranging of services, make arrangements with Engineer to do this work at night, or Sunday, or at special time of day or year with length of shutdown agreed upon before work is begun. Contractor shall bear any overtime and/or work costs in order to provide the connection.

H. All piping, cleanouts and covers, and other mechanical items in way of construction or remodeling, shall be rerouted, relocated or otherwise adjusted to work out with such construction or changes shown or specified in any or all of various sections of specifications. Unknown piping that is encountered will be referred immediately to Architect for method of disposition before continuation of work.

I. This Contractor shall review the architectural drawings to become familiar with the phasing of the construction requirements for this project.

8. GUARANTEE AND SERVICE

A. Guarantee all equipment, materials, and workmanship for a period of one (1) year following date of acceptance.

B. During the period of guarantee any defects in equipment, materials, or workmanship shall be promptly corrected without cost to the Owner.

C. Guarantee includes equipment capacity and performance ratings specified without excessive noise levels. Any deficiencies in equipment capacity specified shall be promptly corrected.

D. Guarantee does not include maintenance items.

PART 2 – PRODUCTS

9. ACCESS PANELS

A. Provide all access panels necessary for proper access to valves, traps, fixture connections, control devices or other items installed under this contract.

B. Panels to be Milcor, Type M, or KARP Model D3C-214M hinged with screwdriver lock or as indicated on drawings for special locations, minimum size 12” x 12” or larger as required for proper access.

C. Exact locations for panels to be directed by Architect.

10. TOOLS AND SCAFFOLDING

Furnish all tools, equipment, scaffolding and other facilities required to properly and expeditiously perform the work.

11. SIPHON PREVENTORS

Furnish and install on all equipment and fixtures requiring same, backflow preventors or vacuum breakers of a type approved by the Louisiana Health and Human Resources. Water connections to fixtures and equipment shall be made in such a way as to prevent back siphonage when the water supply is out or the pressure drops. Provide reduced pressure type back flow preventors where indicated on drawings. They shall be Watts series 900 or Febco Series 825, size as indicated on drawings.

12. SLEEVES AND THIMBLES

A. Pipe sleeves - wrought iron or cast iron of sufficient size for piping and installation to be installed in floors, walls below grade, and grade beams where piping passes through.

B. Thimbles above grade - heavy galvanized steel of proper size to allow freedom of piping and insulation, set in floor or roof slab as work progresses, also to be installed in wall and partitions where piping passes through.

C. Thimbles below grade - same as pipe sleeves above.

D. Sleeves through floors extend 1/4" above finished floor. Caulk around and seal all piping in chases and piping passing through floor slab.

E. Provide sleeve seals and shields for all pipe penetrations of ground floor slab.

F. Provide fire-stopping in all pipe penetrations of rated floors and walls, see Architectural Specifications for Requirements.

13. BUCKS, GROUNDS AND CHASES

A. Be responsible for proper location and sizes or for any errors or omission in placing same.

B. Failure to inform the General Contractor promptly of such requirements shall not relieve the Mechanical installer of the responsibility for providing a complete mechanical system.

14. HANGERS

A. Horizontal piping above grade without hubs shall be rigidly supported. Distance between pipe supports:

1.	1/2" pipe	6'-0" maximum
2.	3/4" pipe	7'-0" maximum
3.	1" pipe	8'-0" maximum
4.	1 1/4" pipe	9'-0" maximum
5.	1 1/2" pipe and over	10'-0" maximum

B. Hangers shall be similar to "Split Ring" type.

C. Metal strap or wire will not be acceptable.

D. For two or more systems of piping run parallel and with same grade trapeze hangers may be used.

E. Use #22 gauge galvanized sheet steel saddles between the pipe covering and each pipe hanger on all insulated lines. Saddles shall extend along pipe runs and at least half way up piping on each side.

F. All above grade horizontal sewer drain, vent, waste and similar piping shall be hung at every hub using the same type hangers as specified for other piping.

G. All new underground piping, under building and under all pile supported slabs, shall be supported from the slab with stainless steel hangers as detailed on drawings.

15. PAINTING AND IDENTIFICATION

A. Equipment, including pumps, motors, and similar factory fabricated and assembled units shall be furnished with factory applied protective prime coat paint of finished baked enamel. Equipment surfaces damaged during course of construction or shipment shall be refinished by the Mechanical Contractor.

B. Uncoated black ferrous piping and fittings shall be cleaned under this section and painted with one coat of enamel paint under PAINTING SECTION. Color of piping shall be selected by Architect. Hangers and supports shall be coated by dipping or brush painting with one coat of asphalt varnish. Steel frame equipment supports shall be cleaned and painted with one coat of aluminum paint.

C. Detached motor controllers, disconnects, etc., shall be identified with metal or plastic plates with etched letters to completely identify service of electrical equipment.

D. Major control and sectionalizing valves shall be identified by means of etched brass plates bracketed to valve handle. Contractor shall prepare schedule of such identifying plates for Architect's approval.

PART 3 – EXECUTION

16. EXCAVATION, TRENCHING AND BACKFILL

A. The Contractor shall perform all excavation of every description and of whatever substances encountered to the depths indicated on the drawings. During excavation material suitable for backfill shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins. All material not suitable for backfilling shall

be removed completely from job site. Such shoring shall be done as hereinafter specified.

B. Trenches shall be of necessary width for the proper laying of the pipe and the banks shall be as nearly vertical as practicable. The bottom of the trenches shall be accurately graded to provide uniform bearing and support. Bottom of trenches shall have 6" layer of compacted limestone aggregate. Care shall be taken to provide uniform bearing and support.

C. Bell holes and depressions for joints shall be dug after compaction and grading in order that the pipe will be supported along its entire length. Whenever wet or otherwise unstable soil that is incapable of receiving the bottom preparation and support piping, as determined by the Engineer, is encountered, such soil shall be removed to the depth required and the trench backfilled to the proper grade with river sand.

D. All shoring required to perform and protect the excavation, and as required for the safety of employees, shall be installed. The sides of the trenches, four (4') feet or less shall be protected as required. For trenches more than four (4') feet in depth, the sides shall be secured by the use of continuous sheet piling and shall be not less than two (2") inches in thickness.

E. The trenches shall not be backfilled until all required pressure tests are performed and until the certificates of inspection from the proper authorities are obtained by the Contractor. The trenches shall be carefully backfilled with the excavated materials approved for backfilling consisting of earth, loam, sandy clay, sand and gravel, or other approved materials free from large clods of earth or stone, deposited in six (6") inch layers and thoroughly and carefully rammed until the pipe has a cover of not less than two (2') feet. The remainder of the backfill material shall then be thrown into the trench in one (1') foot layers and tamped. Any trench improperly backfilled, or where settlement occurs, shall be reopened to the depth required for proper compaction, then refilled and compacted, with the surface restored to the required grade and compaction, mounded over, and smoothed off. Sidewalks, drives and streets broken up by this work shall be repaired and returned to original condition.

17. FLASHING AND COUNTERFLASHING

All pipes and ducts that pass through roof and walls shall run so as not to interfere with the structural system and to permit proper application of base and counterflashing. All plumbing vents are to be finished with 2-1/2 pound sheet lead turned down into pipe. Other pipes to be provided with suitable curbs and flashed to roof or walls as indicated

18. CLEANING, STERILIZING AND PIPING

A. When all work has been finally tested, Contractor shall clean all fixtures, pipes and exposed work.

B. All pipes shall be free from all obstructions.

C. All plated and other finished products shall be thoroughly cleaned and polished.

D. New water piping shall be sterilized as required by State Plumbing Code.

E. All piping shall be installed so that it may expand and contract freely without damages to equipment, other work, or injury to piping system. All necessary swing joints, expansion joints, or offsets to protect piping, etc., shall be installed whether indicated or not. Piping shall be graded to allow for system drainage.

F. Stainless steel or chromium plated floor, wall and ceiling plates shall be furnished on all exposed piping passing through floor, walls, or ceilings. Plates shall be secured in place with round head screws or toggle bolts of proper size and type for adjacent construction.

G. All piping shall be installed and sized as indicated on plans and be of equivalent materials to piping as hereinafter specified.

H. All piping shall be installed with runs arranged parallels or perpendicular to walls and ceilings with symmetrical and equal spacing between parallel pipes. Offsets shall be made using factory fittings, bending of piping shall not be accepted.

I. Notify Architect a minimum 72 hours prior to enclosing piping in concealed spaces so that piping may be inspected.

19. TESTING AND INSTRUCTION

A. Piping shall be tested to pressure hereinafter specified. Where pressures are not mentioned, it shall be understood that testing to 1-1/2 times service conditions, before insulation is applied, will be acceptable. All tests shall be held for a minimum of 24 hours before inspection.

B. Furnish all necessary gauges, pumps, test plugs, and temporary connections and shall test sections of the building as work progresses.

C. All new underground sewerage, waste piping shall be plugged at outlets and tested hydrostatically to 10 psi before being covered. Notify Engineer a minimum 72 hours prior to any backfill of underground piping so that piping and piping hangers may be inspected. Failure to notify Engineer prior to backfill will

constitute a rejection of the underground piping installation. All other drainage piping, vent and waste risers shall be plugged and tested by filling with water from top to bottom of each floor prior to being connected to fixtures. Tests shall be held a minimum of 24 hours.

D. All new cold and hot water supply piping shall be tested hydrostatically to 125 pounds per square inch before application of insulation. Test shall be held a minimum of 24 hours.

E. All new gas piping shall be air tested to a pressure of 75 PSI. During the test, all joints shall be painted with a soap solution to test for leak. The test shall be held a minimum of 24 hours.

F. All new pool piping shall be tested hydrostatically to 75 pounds per square inch before application of insulation. Test shall be held a minimum of 24 hours.

G. All tests shall be made in the presence of the Architect or his representative. Where pipes or connections in new piping are found to leak, They shall be made tight and the tests repeated.

H. Make all necessary adjustments to controls, dampers, valves, etc., to obtain best operation first with empty building and later under actual conditions.

I Thoroughly check the operation of each item of equipment and controls while testing, without waiting first for the Owner or Architect to complain about their operation. Verify that same are wired correctly and completely, notifying the proper parties for necessary corrections. Thoroughly instruct the Owner's representative in the operation and care of controls, individual equipment, and entire system.

J. Provide Architect with six (6) copies of balance reports as hereinafter specified.

K. After adjustment period and before acceptance replace all air filters with specified type.

20. CUTTING AND PATCHING

Cooperate to the fullest extent with all other trades to reduce to a minimum the amount of cutting and patching of other work necessary for this installation. Do not cut or patch the work of other trades but arrange to provide cutting templates in time, or otherwise pay the respective other contractors for changing theirs, to accommodate this work. No cutting into any structural units likely to impair the strength shall be done without the approval of the Architect.

21. CLEAN UP

Remove debris, surplus and waste materials, oil, grease or stains resulting from the work performed and leave the premises in a broom clean condition AT THE END OF EACH WORKING DAY. All debris, surplus and waste material shall be removed completely from the job site.

22. COMMISSIONING

A. Contractor shall install all items of equipment as identified in this specification in strict accordance with manufacturer's requirements (whether identified in this specification or not), shop drawings and contract documents. Contractor shall coordinate with Electrical and Building Temperature Control System Contractors to insure a complete installation. Start-up of all equipment shall be by manufacturer authorized representative. Start-up services shall be provided for as long a period of time as is necessary to insure proper operation of the equipment items. The start-up technician shall conduct all operating tests as required to insure the equipment is operating in accordance with design parameters. Complete testing of all safety and emergency control devices shall be made. The start-up technician shall submit a written report to the engineer (prior to final punch list inspection) containing all test data recorded as required above and a letter certifying that the equipment is operating properly.

B. Other specific items of commissioning shall be as follows:

1. Visually inspect insulation system to verify that insulation is continuous and vapor barrier is complete. Verify there is no condensation or hot spots.

2. Thoroughly test all piping systems to insure no leaks are present. Adjust valves, pressure reducing valves, etc., as required by operating characteristics of the system.

3. Check operation all plumbing fixtures to insure proper water flow (hot & cold) and drainage. Adjust temperature of hot water systems to design parameters. Verify that roof drains, floor drains and hub drains are not clogged and drain water. Adjust hot water recirculation balance cocks, pumps and piping to insure hot water flow is present at all fixtures within 10 seconds.

4. Ductwork shall be tested. See Section 15800

5. Vibration isolation shall be tested by running equipment and checking deflection of spring isolators. Make adjustments as required. No isolator shall be fully compressed.

6. Piping shall be checked to insure direction of flow.

7. Put into operation the complete pool circulation, salt chlorine and filtration system. Completely test all operating systems and full instruct the Owner's representative in the operation and maintenance of the system.

8. Coordinate with Section 15800 contractor to ensure mechanical systems operate in accordance with plans and specifications. Heating and cooling modes of HVAC equipment shall be tested. Actual values of temperature and humidity in space shall be checked against set point values and deviations shall be corrected.

9. Provide written reports for all startup and commissioning tests on above systems for Engineer to review prior to START of final punch list inspection.

23. WELDING

A. Codes and Standards

1. American Society of Mechanical Engineers (ASME) B31.1
2. ASME Boiler and Pressure Vessel Code – Section V and IX
3. American Welding Society (AWS) D10

B. Qualifications for Welding Work: The fabricator and/or installer shall qualify each welder or welding operator for the welding processes to be used during production and field welding. The performance qualification shall be in accordance with a qualified Welding Procedure Specification (WPS). The WPS shall be governed by the essential variables listed in ASME Section IX and AWS D10.9 as may be applicable for the welding processes for which the welder is being qualified. Provide certification that the welders performing work on this project are qualified in accordance with the WPS, as well as the parameters used in the qualification.

C. Welds shall be in accordance with ASME and AWS standards as qualified under ASME Section IX. Owner may employ a testing agency to perform a visual inspection of 5% of the welds in accordance with ASME Section V. The following visual examination indications shall be deemed unacceptable and shall be corrected at Contractor's expense:

1. Cracks on external surfaces
2. Surface undercut greater than 1/32 inch deep
3. Weld reinforcement greater than specified in ASME Table 127.4.2
4. Lack of fusion on surface
5. Incomplete penetration

D. Future inspections for failed welds shall be tested at Contractor's expense.

24. OPERATION OF AIR-HANDLING UNITS DURING CONSTRUCTION

Contractor shall provide 2”-85% efficient filters for units with 1.0” ESP and greater or (2) MERV 15, 1” filters for units under 1.0” ESP for air-units operated during construction. In addition roll type filter media shall be provided on all return air grilles and unit openings. Contractor shall be responsible for changing media as required. The Contractor is to protect the air unit coils and keep air-unit and duct interior surfaces clean. If the Contractor fails to comply with the filtration requirements, the Contractor shall clean and/or replace the coils and duct system at his expense, and no additional cost to the Owner.

END OF SECTION

SECTION 15250 - PIPING AND EQUIPMENT INSULATION

PART 1 - GENERAL

1. SUMMARY

A. Provide a complete system of insulation, as herein specified, for both inside and outside of building.

B. The General Provisions of the Contract including General and Supplementary Conditions and General Requirements apply to the work specified in this Section.

C. Refer to Section BASIC MATERIALS AND METHODS, which is applicable to this Section.

D. Insulation shall include insulating materials, their applications, finish, bands, tie wire and weather protection for all piping, fittings, valves, and equipment as indicated and specified herein.

2. GENERAL

A. All insulation shall be applied in a workmanlike manner by skilled workmen regularly engaged in this type of work.

B. All pipe insulation shall have COMPOSITE flame and smoke hazard ratings as tested in accordance with standard testing methods (NFPA) 255 and UL 723).

C. Composite ratings shall not exceed: flame spread 25, smoke developed 50.

D. Accessories such as adhesive, mastic, cement, tapes and asbestos cloth shall have the same component ratings as listed above.

E. THE INSULATION CONTRACTOR SHALL CERTIFY IN WRITING, PRIOR TO INSTALLATION, THAT ALL PRODUCTS TO BE USED WILL MEET THE ABOVE CRITERIA.

PART 2 - PRODUCTS

3. AIR CONDITIONING DRAINS PIPING

A. Insulate all air conditioning condensate drains, pipe, fittings, flanges and valves with flexible foamed plastic tubing insulation, J-M Aerotube 11, Nomaco K-flex, or approved equal. Thickness to be 3/4 inch.

B. Insulate all horizontal waste piping above ground that receives A/C condensate from drain to vertical stack. Also insulate the "P" trap of those drains. Insulation

shall be same as specified for above ground domestic cold water piping, fitting flanges and valves except thickness shall be 1/2 inch for all pipe sizes.

4. DUCT INSULATION

   A. DUCT SIZES SHOWN ON DRAWINGS ARE FREE AREA SIZES. See Section 15800 for insulation and duct material and type required for each application. Insulation shall be as per the following:

   B. Lined Duct system - All lined ducts shall be lined with Knauf Duct Liner E-M, Owens Corning, or approved equal. Duct Lining shall be applied in strict accordance with the latest edition of SMACNA's "HVAC Duct Construction Standard Metal & Flexible." Mechanical fasteners shall meet "Standards for Mechanical Fasteners MF-1-1975." Length of mechanical fasteners shall not compress the insulation more than 1/8" and shall be installed perpendicular to the duct surface. Adhesive shall conform to ASTM C 916 and be applied to the sheet metal with a 90% minimum coverage. All exposed edges of the duct liner material shall be coated with the same adhesive. All rips and tears shall also be repaired using adhesive. All internal duct areas shall be covered with duct liner. Transverse joints shall be firmly butted with no gaps, and coated with adhesive. Longitudinal corner joints shall be overlapped and compressed. For velocities from 4001 to 6000 FPM, metal nosing shall be applied to all upstream transverse edges to additionally secure the insulation. Lined duct insulation shall only be installed where indicated on drawings.

   C. Exterior Duct Wrap - Exterior insulation duct wrap shall be fiberglass wrap, 2” thick, WITH A MINIMUM DENSITY OF 1.5 PCF with F.S.K. jacket,. KNAUF, Owens Corning, or approved equal. Provide gray vinyl jacket where exposed in equipment rooms.

5. DOMESTIC HOT AND COLD WATER PIPING ABOVE GROUND

   A. Insulate all new above ground hot & cold water pipe with glass fiber pipe insulation with factory applied white all service jacket, with self-sealing lap (ASJ-SSL) as manufactured by KNAUF, Owens Corning, or approved equal.

   B. Insulate fittings, flanges and valves with performed insulation with PVC premolded one-piece fitting covers, with fiberglass inserts, Proto covers, or approved equal. Premolded or shop fabricated Glass Fiber covers may be used in lieu of above at the Contractor’s option. Optional covers to be given a smoothing coat of finishing cement, Ryder “V” one coat, or approved equal, in exposed areas and vapor sealed in all areas with vapor barrier mastic coating. Foster 30-35, or approved equal, reinforced with white glass fabric.

   C. Insulation thickness for all cold water piping to be ½ inch.

D. All new domestic hot water and hot water circulating piping shall be insulated in accordance with the Schedule below.

	PIPE DIAMETER	INSULATION THICKNESS
Runouts to individual fixtures, not exceeding 12 feet in length	up to 2”	½”
All mains, branches and other piping	2” and less	1”
	2-1/2” to 4”	1-1/2”

E. Provide an isolating vapor seal between pipe insulation jacket and pipe at butt joints of insulation at fittings, flanges, valves, hangers and at 21 foot intervals on continuous runs. Using Foster 30-35 vapor barrier mastic coating, or approved equal.

F. Adhere longitudinal laps and butt strips of jacket with factory applied pressure sensitive tape system, as manufactured by KNAUF, Owens Corning, or approved equal.

6. REFRIGERANT PIPING

A. Insulate all refrigerant suction piping, valves and fittings.

B. Insulation shall be foamed closed cell tubing insulation, JM Aerotube11, Nomaco K-flex, Armaflex, or approved equal, thickness shall be ¾ inch.

7. CHILLED WATER PIPING

A. All chilled water piping and fittings, above ground inside the building, shall be insulated with 100% rigid cellular glass molded pipe insulation. Insulation shall have an average density of 8 lb./cu.ft. and shall have a thermal conductivity of 0.31 BTU-in/hr.sf.degrees F. at 50 degrees F. The insulation shall comply with ASTMC 552, Type II furnished in half sections of 24” long.

B. Insulation shall be installed with all seams and joints sealed with water proof sealant as recommended by the manufacturer. After sealant is applied insulation shall be secured with ½” wide by 0.010” thick stainless steel bands with matching seals. Sealants shall be applied full depth of all joints and shall not be used to fill voids or cracks.

C. Cover all new insulation with an all purpose jacketing of kraft paper/aluminum foil/vinyl coating construction.

D. Insulate fittings, flanges and valves with same material and thickness as adjacent piping. Cover insulation with same jacket as adjacent piping.

E. Chilled water pipe insulation shall have the following thickness:

Pipe Size	Insulation Thickness
Up to 1”	2”
1-1/4” to 4”	2-1/2”
5” to 12”	3”

F. Provide one or two layer expansion/contraction joints in accordance with manufacturer’s recommendations.

G At contractor’s option interior chilled water piping may be insulated with closed phenolic foam insulation, as manufactured by Resolco Inc. or approved equal. Insulation shall have a ”K” value ASTM C-518 .15 BTU-in/.F@75°F with a Maximum service temperature 250°F ; a Maximum moisture absorption of 0.5 % by volume ; and a 2.5 lb/cu ft density. Insulation shall have a Vapor Barrier Jacket that is Venture Wrap or Venture Clad; a moisture vapor transmission per ASTM E 960 of .01 perm; that is Secured with self sealing longitudinal laps and butt strips and with vapor barrier mastic. Vapor barrier lap adhesive shall be Childers CP-76 or approved equal and shall be compatible with the insulation. Materials shall have a flame spread index of less than 25 and a smoke-development index of less than 50 in accordance with ASTM E 84. Minimum thickness shall be as listed below:

Pipe Size	Insulation Thickness
Up to 1”	1-1/2”
1-1/4” to 4”	2”
5” and above	2-1/2”

H Also at Contractors option the following flexible closed cell elastomeric tubular insulation system, AP Armaflex, AP Armaflex SS, or approved equal, may be used.

1. Materials shall have a maxium thermal conductivity of 0.27 BTU-in/hr.sf.degrees F. at 75 degrees F.in accordance with ASTM C 177 or ASTM C 518. Maxium water vapor transmission of 0.08 perm-inches in accordance with ASTM E 96.

2. Materials shall have a flame spread index of less than 25 and a smoke-development index of less than 50 in accordance with ASTM E 84.

3. All seams and butt joints shall be adhered and sealed using Armaflex 520 0r 520 BLV adhesive.Insulation shall also be adhered directly to the piping at the high end using a two inch strip of Armaflex 520 or 520 BLV. All exposed ends cuts shall also be coated with Armaflex 520 or 520 BLV adhesive.

4. Insulation shall have the following thickness:

Pipe Size	Insulation Thickness
Up to 1”	1”
1-1/4” and above	1-1/2”

5. Entire installation shall be in strict accordance with the Manufactures recommendations.

PART 3 - EXECUTION

8. WORKMANSHIP AND INSTALLATION

A. All insulation shall be applied per manufacturer's specifications and installation requirements.

B. Insulation shall be applied over clean dry surfaces after all test have been performed and approved.

C. Methods of application and other details not specified herein shall be in accordance with manufacturer's recommendations, which shall constitute minimum standards.

D. Sheet Metal Saddles - 10" long shall be provided on all hangers supporting insulated lines. They shall be fabricated to conform with the outside diameter of the pipe covering and shall be fabricated from 22 gauge sheet iron for pipe through 2-1/2" 20 gauge sheet iron for pipes through 8" and 16 gauge for all pipes over 8".

E. A rigid insulation material shall be used at each pipe hanger as an insert and the pipe covering shall pass full thickness through the hangers.

G. On all outdoor piping, above ground, insulation provide aluminum jacket 0.016 inch thick with longitudinal z-joint secured with preformed 2" wide butt strips, as manufactured by KNAUF, RPR, or approved equal. Provide preformed aluminum fitting cover on all fittings.

END OF SECTION

SECTION 15400 - PLUMBING

PART 1 - GENERAL

1 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General and Supplementary Conditions and General Requirements apply to the work specified in this Section.

2 DESCRIPTION OF WORK

A. Furnish and install new fixtures, waste, vent, cold water and hot water piping shown on plans.

B. Connections of all equipment and fixtures with accessory fittings, shut-off valves, trimmings, traps, structural supports, insulation, etc., as herein specified and/or as shown on drawings.

C. Refer to SECTION 15050 which is applicable to this Section.

D. Include (but not necessarily limited to) the following items of mechanical equipment, fixtures and materials installed and in a first class operating condition:

1. All labor, materials, equipment, accessories, and miscellaneous items required to provide a complete plumbing system. Provide adequate supervision at all times during the progress of the work.
2. All plumbing piping and hangers for same as specified herein and where shown on the Architectural and/or mechanical drawings.
3. New Building water piping and connection to existing water distribution as shown on the drawings.
4. New Building sewer piping and connection to existing sewer distribution as shown on the drawings.
5. Hose bibbs.
6. Floor, and miscellaneous drain grate replacements.
7. All sewer, waste and vent piping and all cleanouts necessary for a complete operation installation as shown on mechanical drawings, or as required by the State and Local Plumbing Codes.
8. Temporary water, sanitary, etc., facilities during construction period.

3 QUALITY ASSURANCE

Provide plumbing fixtures and accessories for work in this Section, meeting the requirements equal to those specified.

PART 2 - PRODUCTS

4. DOMESTIC WATER

A. Valves shall be provided where indicated on drawings and shall be designed for a minimum water working pressure of not less than one hundred fifty (150) pounds per square inch.

B. Hot and cold water piping above ground and inside the building shall be hard drawn seamless copper tubing, type "L", with wrought copper sweat fittings and lead free solder above grade. No joints shall be allowed under building slab, on piping 1" and smaller, larger pipe sizes shall have joints with lead free solder. Water piping underground shall be Type "K". Piping on exterior of building shall be Type “K”.

C. All water piping, fittings, solder and flux used in conjunction with the potable water systems shall be lead free. The term "lead free" shall be as defined in the Safe Drinking Water Act Amendment of 1986 (P.L. 99-339).

5. SANITARY SEWER

A. All soil, waste and vent piping 2" in size and larger shall be service weight cast-iron, bell and spigot. All cast-iron lines shall have neoprene gaskets. All waste and vent lines 1-1/2" in size and smaller shall be galvanized steel cast-iron drainage fittings. At Contractor's option piping above ground may be "No-Hub".

B. Cleanouts in sanitary lines, both inside and outside at building, cast-iron body caulking ferrules with brass thread flanged plugs as manufactured by Alabama Pipe Co., or approved equal.

C. Cleanout covers located in floors for sewer lines inside of building, with satin brass scoriated tops and covers.

D. Cleanouts shall be installed in each change of direction of sewer lines where more than a 45 degree angle turn is made.

E. Cleanouts on exterior underground lines shall be brought to a cast-iron cleanout box, with service marking, 1/2" thick flanged type and loose cover. Provide 12" X 4" thick concrete slab around cover and frame.

F. Size and distance between cleanouts shall be required by local authorities and/or as indicated on drawings.

G. Provide swing joints in all sewer piping at exits from under building slab, as detailed on the drawings.

6. FIXTURES

A. Furnish, install and/or connect all plumbing fixtures indicated on drawings or as herein specified. Refer to Mechanical as well as Architectural Drawings for location and number of fixtures required. If any fixtures shown on Architectural Plans but not on Mechanical Plans, or vice versa, these fixtures shall be furnished, installed and connected the same as if indicated on all drawings.

B. Where a specific manufacturer's name and catalog number is used to indicate the type and quality required, it shall be assumed that other manufacturer's products may be used, where they are equal and approved by the Architect as stipulated elsewhere herein.

C. Each plumbing fixture shall be fitted with all necessary and proper fittings, trim and operating devices and shall be left in perfect operating condition. The finish of all traps, wall escutcheons, and exposed metal work in connection with fixtures, trimmings and operating devices shall be chromium plated.

D. Before setting any fixtures or rough-in for fixtures, obtain the exact mounting height, as desired, from the Architect.

E. Fixtures and Equipment shown on drawings to be furnished under other sections shall be roughed-in, installed and connected by this Contractor under this Section. This Contractor shall furnish and install all necessary valves, piping, fittings and waste traps, etc., not provided with said equipment but as required for proper operation and installation. Obtain rough-in dimensions before installing any piping.

F. Plumbing fixtures of this section shall be as follows:

WATER CLOSET (MARK P-1)
Floor mounted; china; flush valve; elongated rim; low consumption; open front white seat less cover; battery operated flush valve with metal cover, over-ride button, screwdriver stop and back flow vacuum breaker.

Fixture – Sloan Model ST-2000-1.28
Flush Valve – Sloan Regal Model 8111-1.28
Seat – Beneke Model 523

WATER CLOSET (MARK P-1A)
Floor mounted; bottom outlet; china; elongated rim; top spud; low consumption; mount for handicap use, ADA compliant; open front white seat less cover; battery operated flush valve with metal cover, over-ride button, screwdriver stop and back flow vacuum breaker.

Fixture – Sloan Model ST-2020-1.28
Flush Valve – Sloan Regal Model 8111-1.28
Seat – Beneke Model 523

WATER CLOSET (MARK P-1B)
Combination floor mounted water closet and lavatory; stainless steel fixture; integral polished seat, concealed low consumption flush valve; Push button dual temperature self closing lavatory faucet; open grid strainer; penal bubbler; with waste to wall; recessed tissue holder; risers with wheel handle stops; provide all piping from supplies to fixture:

Fixture: Bradley Model COMBI 5600-C-FTD –WALL- ISEAT-BB-4-8-ADTS-PF-CW-CO-LCHFV-RTH;

LAVATORY (MARK P-2)
Counter Lay In; 20X17 oval; mount for handicap use, ADA compliant; vitreous chinal; 4" centers; grid strainer with 1-1/2" tailpiece; 1-1/2" c.p. "P" trap with waste to wall; battery sensor Faucet with mixer; 3/8" flexible metal c.p. risers with wheel handle stops; provide all piping from supplies to fixture; insulate waste and water piping under fixture with closed cell insulation as manufactured by Truebro or approved equal.

Fixture – Sloan Model SS-3002
Faucet – Sloan Model EBF-187-4
Grid strainer – McGuire Model 155A
Trap - McGuire Model 8872
Supplies – Brass Craft Model OCR1912 A C
Insulation – Truebro Model 102 E-Z

URINAL (MARK P-3)
Wall hung; china; top spud; low consumption; wall hanger; battery electronic sensor flush valve with vacuum breaker and screwdriver stop.

Fixture – Sloan Model SU-1006-1.0
Flush Valve – Sloan Model 8180-1.0-LH

URINAL (MARK P-3A)
Same as Mark P-3 except mount for handicap use, ADA compliant

SINK (MARK P-4)
Single compartment sink; countertop, self rimming;18 gauge stainless steel; mount for handicap use, ADA compliant; unit with swing spout faucet, stopper strainers and tailpieces; 3/8" flexible supplies with wheel handle stops; 1-1/2" c.p. "P" trap with waste to wall; provide all piping from supplies to fixture; insulate waste and water piping under fixture with closed cell insulation, as manufactured by Truebro or approved equal.

Fixture – Elkay Model LARD 1918
Faucet – Elkay Model LKE 4100
Stopper – Elkay Model LK-J35

SERVICE SINK (MARK P-5)
Floor mounted; acid resistant enameled cast iron; corner installed; coated wire rim guard; 28”x28”; wall mounted faucet with vacuum breaker, pail hook and 5 ft rubber hose with wall bracket; 3” drain.

Fixture - Kohler Model K-6710
Faucet - Kohler model K-8905

DRINKING FOUNTAIN (MARK P-6)
Wall mounted; recessed refrigeration system; Stainless Steel bubblers with 304 SS front grill; two level; 8 GPH @ 80 degrees F inlet and 90 degrees F room for 50 degrees F water; front push buttons; barrier free ADA compliant;

Fixture - Elkay Model ERPBM28K

EYEWASH (MARK P-7)
Free standing Emergency shower/eyewash with tempered water mixing valve.

Fixture – Bradley Model S19-310BFPB
Thermostatic Mixing Valve - Bradley Model S19-2100-Navigator EFX25

SHOWER (MARK P-8)
ADA compliant shower and valve; see Architectural plans and details for shower Construction; pressure balancing mixing valve faucet with 3-way hand held shower/slide bar; wall supply elbow; 1.75 GPM; 2” floor drain.

Valve Combination – Leonard Aquatrol Model 4505 H-11

HOSE BIBB (MARK HB)
3/4" rough brass, loose key sill cock with vacuum breaker Woodford Model 21

HOSE BIBB (MARK HB-1)
Wall hydrant, freezeless; automatic draining; Woodford Model B67 ,r approved equal, wall box with, rough brass finish cover; loose key with vacuum breaker.

HOSE BIBB (MARK HB-2)
Freezeless roof hydrant with double check backflow preventer; built in automatic drain with vent; rod guide; adjustable lever link; cast iron hydrant support and EPDM boot cover.

Fixture – Woodford Model RHY2

FLOOR DRAIN (MARK FD)
J. R. Smith 2005-B, or Minfab F1100C-S, cast-iron - See plans for sizes. Nickel brass square strainers in toilet rooms and finished areas. All floor drains shall have 4” deep seal traps and trap primer connections.

FLOOR DRAIN (MARK FD-1)
J.R. Smith No 2010-F37 or Minfab F1100C-ER cast iron body and flashing collar with extended rim nikaloy strainer, install with rim flush with floor. All floor drains shall have 4" deep seal traps and trap primer connections.

ROOF DRAIN (MARK RD)
Cast iron drain with sump, flashing clamp, gravel stop and 16" diameter low profile dome. J. R. Smith Model 1010, see drawings for sizes.

AREA DRAIN (MARK AD)
Area drain; Cast iron body with heavy duty cast iron top J.R. Smith No 1410

TRAP PRIMER (MARK TP)
Automatic water metering type, to serve drains as shown on drawings. Install per manufacturers recommendations and provide wall access panel for periodic inspection. Manufacturer Minfab Model MR-500.

7. VALVES, STRAINERS, UNIONS AND FITTINGS

All material shall be new, of the best quality with same brand or manufacturer for all similar installations. SEE SECTION 15900 for type and manufacturer.

PART 3 - EXECUTION

8. WORKMANSHIP

A. All piping, waste and stacks shall be run concealed underground, in ceiling spaces, walls or in chases provided. The entire installation must present an appearance truly in keeping with the best practice and indicative of skill and neatness. In areas of exposed ceilings piping shall be grouped together and run on common pipe hangers with piping run parallel to building lines.

B. All material shall be installed in a neat and workmanlike manner by competent specialists for each sub-trade. The installation of any materials and equipment not meeting these standards may be condemned by the Architect and shall be removed and re-installed at no additional cost to the Owner. Contractor is responsible for the safety and good condition of the materials installed until final acceptance by the Owner.

9. INSTALLATION

A. Pipe shall be laid to the grades and alignment indicated on the drawings. Each pipe shall be laid line to line and grade and in such manner as to form a close concentric joint with the adjoining pipe and to prevent sudden offsets of the flow line. The interior of the pipe shall be cleaned of all dirt and superfluous materials

of every description. Trenches shall be kept free from water until the pipe joining material has set and pipe shall not be laid when the conditions of the trench or the weather is unsuitable for such work. At times when the work is not in progress, open ends of pipe and fittings shall be securely closed, so that no trench water, earth or other substance will enter the pipe or fittings. Minimum compacted covers shall be 2'-0", or as indicated on drawings.

B. Where the location of the sewer is not clearly defined by dimensions on the drawings, the sewer shall not be run closer horizontally than 6'-0" to water supply main except that the bottom of the water pipe will be at least twelve (12") inches above the top of the sewer pipe, both pipes may be lain in the same trench. Where sewer mains cross above water services the sewer piping for a distance of ten (10') feet each side of the crossing shall be cast-iron without any joint closer horizontally than three (3') feet to the crossing.

10. HOT WATER AND COLD WATER SYSTEMS

A. This installation comprises a complete and operating system of hot and cold water distribution and connection to each and every fixture and appliance requiring this service and/or as indicated on drawings.

B. All ends of tubing shall be square cut and burrs removed before assembling. Joints shall be thoroughly cleaned with sandpaper or emery cloth before applying the flux.

C. All water supply piping, fittings, and fixtures shall be protected against water hammer shock, or surge pressure, by adequate air chambers.

D. Each riser battery shall be valved in an accessible location.

E. No hot water piping shall be run closer than six (6") inches from cold water pipes.

F. Distribution and sizes shall be as indicated on drawings.

G. Pitch all piping to low points to allow for system drainage.

H. Make all arrangements with Local Authority for the inspection of new water system, pay all assessed costs and fees.

I. Connect to existing water service piping as shown on the drawings.

11. SANITARY SEWER PIPING

A. New piping shall be a complete system to waste and vent lines from all fixtures to outside the building, and connection to existing sewer piping as shown on the drawings.

B. All waste lines shall be installed on a continuous waste and vent system as required by codes and/or regulations.

C. All piping shall be installed straight and true and sized as indicated on drawings.

D. All changes in direction shall be made by the use of 45 degree wyes, double wyes, long sweep quarter bend or 1/8 bends, except that single sanitary tees may be used on vertical stacks. Tees and crosses may be used in vent pipes.

E. Cleanouts easily accessible shall provide at the foot of each vertical waste or soil stack. Cleanouts shall be of nominal size as the pipes up to four (4") inches and not less than four (4") inches for larger pipes. The distance between cleanouts in horizontal lines shall not exceed those distances required by local authorities, whether indicated or not.

F. All cleanouts installed so as to be easily accessible, and all outside cleanouts installed flush with finished grade.

G. Horizontal soil or waste lines shall be run at uniform grade of not less than 1/4" per foot. Horizontal lines shall be supported or anchored at intervals specified in GENERAL MECHANICAL. All stacks shall be supported at their base and every floor to the roof line and pipes shall be rigidly secured.

H. Every fixture trap shall be protected against siphonage and back pressure and air circulation assured by means of a soil or waste stack vent, a continuous waste or soil vent, a loop or circuit vent.

I. No vents shall be less than 1-1/2” in diameter and no case shall branch or main vent have a diameter less than half that of the soil or waste pipe served, or as required by local code. Minimum vent thru roof shall be 2”.

J. Make all arrangements with Local Authority for the inspection of new sanitary sewer system, and pay all costs and assessed fees.

12. MISCELLANEOUS ITEMS OF WORK

A. Contractor shall be responsible for securing all information and data for connection to all utilities as shown on the drawings, and pay all costs.

B. Contractor shall provide temporary water and sewerage on site for use during construction period as required.

C. All valves shall be installed so as to be easily accessible for cleaning, inspection maintenance, and operation.

D. Provide access panels at all concealed valves.

E. All welded piping to be welded by Certified welders skilled in the work to be done.

F. No piping of dissimilar metals placed in contact or in close proximity with each other. Provide bronze valves wherever piping of dissimilar metals is jointed.

G. Provide all necessary steel frames supports, anchor bolts, sleeves, etc., required for safe support of equipment and piping installed under this contract. The Mechanical Contractor shall be completely responsible for the accurate position and dimensions of all foundations and supports.

H. Contractor shall provide positive protection for all plumbing fixtures after installation to insure that all surfaces shall be free of defects at acceptance.

END OF SECTION

SECTION 15500 - FIRE SUPPRESSION SYSTEM

PART 1 - GENERAL

1. SCOPE

A. Work under this Section shall include all labor, material, equipment, transportation, services and facilities necessary to complete the renovation of the interior Fire Protection System for the building as shown on drawings and as specified herein without exception.

B. Applicable provisions of GENERAL AND SPECIAL CONDITIONS AND SECTION 15050 shall apply to this Section as if written in full herein.

C. The work shall include but is not necessarily limited to the following:

1. Contractor shall renovate the existing sprinkler system, including branches and sprinklers in the area to be renovated and shall provide a new wet pipe sprinkler system for the new areas shown on the drawings.

2. Entire installation shall be in accordance with the latest revisions of NFPA fire codes.

D. Work under this section shall include all labor, materials, engineering, transportation, insurance, taxes and permits required for the complete installation of a wet pipe automatic fire protection system. All work to be in accordance with the requirements of the authority having jurisdiction.

E. Painting, unless otherwise specified is not included under this Section.

F. Sprinkler contractor’s bid shall include all fees and time required to submit the drawings, etc., to the authorities having jurisdiction.

2. CODES AND STANDARDS

A. Final systems design, materials, workmanship and testing shall conform to the following Codes and Standards, when same have jurisdiction.

1. N.F.P.A. No. 13, 14, 24, 101, and all applicable codes.
2. Property Insurance Association of Louisiana.
3. Orleans Parish Fire Prevention Bureau.
4. State of Louisiana Fire Marshal.

3. QUALIFICATIONS OF FIRE PROTECTION CONTRACTOR

Contractor must be licensed in the State of Louisiana to perform sprinkler work, and must be regularly engaged in making such installation.

4. SHOP DRAWINGS AND DATA SHEETS

   A. Contractor to provide Architect with five (5) sets of shop drawings and calculations including flow and hydrant tests for Owner's approval prior to commencement of work. Work is not to be started until: 1) shop drawings have been corrected to conform to Owner's approval, 2) copies of corrected drawings shall be submitted to the Architect and State Fire Marshall, and 3) drawings have been returned from the State Fire Marshall with review comments. Contractor shall submit Owner's stamped approved drawings to the State Fire Marshall for his review. This Contractor shall pay for all review fees required by the State Fire Marshall.

   B. Contractor shall also submit a complete set of shop drawings, calculations and equipment data sheets to the Orleans Parish Fire Department for approval. Contractor shall pay all review fees and costs.

   C. Contractor shall also submit a complete set of shop drawings and equipment data sheets to the chief of the Orleans Parish Fire Department for approval of the type of fire department connectors (F.D.C.), threads and locations of the F.D.C. Contractor shall obtain written approval of the outlet diameters, fitting type and thread type indicating compatibility with the fire department requirements. Submit this written approval along with the submittal documents for the State Fire Marshal.

5. AS-BUILT DRAWINGS

   A. Contractor shall maintain a set of drawings showing exact locations and sizes of all piping, valves and related items, which shall be corrected daily and shown every change from original contract drawings and specifications.

   B. On completion of the work, Contractor shall provide a set of reproducible transparencies or Autocad DWG electronic files, corrected to show all changes noted on "As-Built" Drawings, together with two (2) sets of drawings, to the Architect for delivery to the Owner. The corrected documents shall bear the approval of the Underwriters, and Property Insurance Association of Louisiana.

6. CUTTING AND PATCHING

   A. Contractor to provide all opening for proper installation of the work specified, in foundations, walls, floors, ceilings, partitions, stairways, etc., and do all patching and repairing required, except where otherwise noted on drawings.

   B. Cutting structural members for the passageway of sprinkler piping or for pipe hanger fastenings will NOT be permitted.

C. Holes through walls, floors, and ceilings shall be large enough to accommodate pipe expansion. Suitable plates shall be provided at each hole to insure the effectiveness of the floor or wall as a fire stop.

7. INTERFERENCE

The Sprinkler Contractor shall coordinate with other trades so that interference between piping, conduit, ductwork, equipment, apparatus, architectural and structural work will be avoided. In case of interference developing, the Architect or his authorized representative shall decide which equipment, piping, ductwork, etc., must be relocated, regardless of which was first installed.

8. TAXES

Contractor shall include all taxes required.

9. PERMITS, FEES AND INSPECTION

This Contractor shall obtain and pay for all permits and shall pay all fees required in connection with this work, not covered by permits obtained by General Contractor.

10. CERTIFICATE OF APPROVAL

Upon completion of all work, this Contractor shall furnish the Owner a certificate of approval from such authorities as may have jurisdiction.

11. CLEANING UP

This Contractor shall at all times during construction keep the premises free from waste materials, or rubbish caused by his employees or work and at completion shall remove all surplus materials leaving the building in a clean swept condition.

PART 2 - PRODUCTS AND INSTALLATION

12. WATER CONNECTION

Connections to the existing building fire water mains for the water supplies required for the renovations to the existing fire protection systems shall be provided under this Contract. This Contractor shall make all arrangements and pay all costs for this connection. Contractor shall test and flush piping in accordance with NFPA-24, including certification documents.

13. CONTROL VALVE

O.S. & Y gate valves shall be installed at any and all new connection to the existing mains. Provide contactor on each new valve compatible with fire alarm system, to indicate when valve is closed. Connection to fire alarm system shall be by Fire Alarm Contractor.

14. PIPING

A. All interior pipe shall be ASTM A135 Schedule 40 black steel pipe with malleable iron screw fittings or cut grove fittings similar to Victaulic, Grinell, or equal, as required. Fittings shall be ASME B16.3 Class 300 standard pattern with threads according to ASME B1.20.1. Provide all required pipe supports under building and above ground in accordance with National Fire Codes.

B. At Contractor's option for pipe sizes above 4” in size, piping material may be black steel Schedule 10. Pipe shall meet ASTM A795 and shall be U.L. listed and installed in accordance with NFPA 13. Fitting shall be, roll grooved and shall be U.L.listed and NFPA 13 approved.

C. All piping and fittings shall be rated for the hydraulic pressure encountered throughout the system.

D. All piping shall be manufactured in the United States of America.

15. SPRINKLERS

Sprinkler heads in unfinished areas shall be brass upright or pendant type as required. Sprinkler heads in finished areas shall have recessed chrome plated type heads. All heads in acoustical tile areas shall be centered in the tile, both ways. Contractor shall include, in his bid, any and all heads required to meet all applicable sections of NFPA 13, weather indicated on the drawings or not. It is the intent of this section that the contractor shall remove, and relocate, the existing sprinkles heads in the renovated areas and provide complete and operational systems that shall meet all codes and that all costs shall be included in this bid price. All heads shall be quick response type.

16. SPRINKLER SYSTEMS

A. Wet pipe sprinkler systems shall be provided in the renovated and new areas of the building as shown on the drawing. These systems shall be designed for a Light Hazard Occupancy, except as defined below and /or as noted on the drawings.

B. All food prep, equipment rooms, storage rooms, and electrical rooms shall be provided with a sprinkler system designed for ordinary hazard group 1 occupancy.

C. Contractor shall provide tamper switches on all new valves that can shut off the flow of water to the system as required by NFPA 13. Tamper switches shall be compatible with the Fire Alarm System.

17. VALVES

A. All valves used in the fire protection system shall be UL listed and FM approved with 175 psig non shock minimum working pressure rating.

B. Gate valves, 2 inches and smaller shall be UL 262 cast bronze, threaded ends, solid wedge, outside screw and yoke, rising stem.

C. Gate valves 2-1/2" and larger shall be 262, iron body bronze mounted, taper wedge, outside screw and yoke, rising stem.

D. Swing check valves, 2-1/2" and larger shall be UL 312, cast-iron body and bolted cap with bronze or cast iron disc with bronze disc ring.

18. MASON AND CARPENTER WORK

Provide all openings for proper installation of work specified, in walls, ceilings, and floors and do all patching of same as required.

19. ENGINEERING

Prior to installation of any work, this Contractor is to prepare installation and fabrication
drawings and have same approved by the insurance authority having jurisdiction and Owner's representative.

20. INSURANCE

This Contractor is to furnish certificates of insurance prior to commencing work.

21. PERMITS

This Contractor is to pay for all permits required for this portion of the work.

22. HYDROSTATIC TEST

This Contractor is to hydrostatically test the entire interior system, new and existing, to 200 PSI for a period of two (2) hours in accordance with NFPA 13, and show evidence that he has had an authorized representative of the Owner present for the test.

23. WARRANTY

This Contractor is to warrant all material and workmanship, free from defects, for a period of one (1) year from date of acceptance of installation.

24. CODE COMPLIANCE

A. The Contractor shall flush all piping, new and existing as required by NFPA-13, 14 and 24. Flow rates for flushing shall be as required by these codes.

B. All signage shall be provided in accordance with NFPA-13, 14, and 24.

C. All test certificates in NFPA 13, 14, and 24 shall be completed by Contractor and submitted as part of review process.

D. Contractor shall review reflected ceiling, mechanical, fire protection and electrical plans and include all heads as required by NFPA-13 for complete sprinkler coverage including coverage around obstructions such as ductwork, piping and ceiling features.

END OF SECTION

SECTION 15550 - CLEAN-AGENT FIRE SUPPRESSION SYSTEM

PART 1 - GENERAL

1 SCOPE

A. This specification outlines the requirements for a “Total Flood” Clean Agent Fire Suppression System with automatic detection and control. The work required for this system includes all engineering, labor, materials, equipment and services necessary, and required, to complete and test the suppression system. The system shall be installed in the areas as shown on the drawings.

2 APPLICABLE STANDARDS AND PUBLICATIONS

A. The design, equipment, installation, testing and maintenance of the Clean Agent Suppression System shall be in accordance with the applicable Requirements set forth in the latest edition of the following codes and standards

1. NFPA No.2001 - Clean Agent Fire Extinguishing Systems
2. NFPA No.70 - National Electrical Code
3. NFPA No.72 - Standard for Protective Signaling
4. Factory Mutual Approval Guide
5. UL Listings

3 QUALITY ASSURANCE

A. MANUFACTURER

1. The manufacturer of the suppression system hardware and detection components shall be ISO 9000 registered.
2. The name of the manufacturer shall appear on all major components.
3. All devices, components and equipment shall be the products of the same manufacturer.
4. All devices, components and equipment shall be new, standard products of the manufacturer’s latest design and suitable to perform the functions intended.
5. All devices and equipment shall be U.L listed and/or FM approved.
6. Locks for all cabinets shall be keyed alike.

B. INSTALLER

1. The installing contractor shall be trained by the supplier to design, install, test and maintain fire suppression systems.
2, When possible, the installing contractor shall employ a NICET certified special hazard designer, Level II or above, who will be responsible for this

project.

3. The installing contractor shall be an experienced firm regularly engaged in the installation of automatic Clean Agent, or similar, fire suppression systems in strict accordance with all applicable codes and standards.
4. The installing contractor must have a minimum of five (5) years experience in the design, installation and testing of Clean Agent, or similar, fire suppression systems. A list of systems of a similar nature and scope shall be provided on request.
5. The installing contractor shall show evidence that his company carries a minimum $2,000,000.00 liability and completed operations insurance policy. These limits shall supersede limits required in the general conditions of the specifications.
6. The installing contractor shall maintain, or have access to, a Clean Agent recharging station. The installing contractor shall provide proof of his ability to recharge the largest Clean Agent system within 24 hours after a discharge. Include the amount of bulk agent storage available.
7. The installing contractor shall be an authorized stocking distributor of the Clean Agent system equipment so that immediate replacement parts are available from inventory.
8. The installing contractor shall show proof of emergency service available on a twenty-four-hour-a-day, seven-day-a-week basis.

C. SUBMITTALS

1. The installing contractor shall submit the following design information and drawings for approval prior to starting work on this project:

    a. Field installation layout drawings having a scale of not less than 1/8” = 1’0” or 1:100 detailing the location of all agent storage tanks, nozzles, pipe runs including pipe sizes and lengths, control panel(s), detectors, manual pull stations, abort stations, audible and visual alarms, etc.
    b. Auxiliary details and information such as maintenance panels, door holders, special sealing requirements and equipment shutdown.
    c. Separate layouts, or drawings, shall be provided for each level, (i.e.; room, underfloor, and above ceiling) and for mechanical and electrical work.
    d. A separate layout or drawing shall show isometric details of agent storage containers, mounting details, proposed pipe runs and sizes, and symbol legend.
    e. Electrical layout drawings shall show the location of all devices and include point-to-point conduit runs and a description of the method(s) used for detector mounting.
    f. Provide an internal control panel wiring diagram which shall include power supply requirements and field wiring termination points.
    g. Separate drawing providing symbol legend to identify all symbols used.
    h. Annunciator wiring schematics and dimensioned display panel illustration

shall be provided. (Optional device.)

i. Complete hydraulic flow calculations, from a UL listed computer program, shall be provided for all engineered Clean Agent systems. Calculation sheet(s) must include the manufacturers name and UL listing number for verification. The individual sections of pipe and each fitting to be used, as shown on the isometrics, must be identified and included in the calculation. Total agent discharge time must be shown and detailed by zone.
j. Provide calculations for the battery stand-by power supply taking into consideration the power requirements of all alarms, initiating devices and auxiliary components under full load conditions.
I. A complete sequence of operation shall be submitted detailing all alarm devices, shutdown functions, remote signaling, damper operation, time delay and agent discharge for each zone or system.

2. Submit drawings, calculations and system component data sheets for approval to the local fire prevention agency, owner's insurance underwriter, and all other authorities having jurisdiction before starting installation. Submit approved plans to the architect/engineer for record.

4 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. The work listed below shall be provided by others, or under other sections of this specification:

1. 120 VAC or 220 VAC power supply to the system control panel.
2. Interlock wiring and conduit for shutdown of HVAC, dampers and/or electric power supplies, relays or shunt trip breakers.
3. Connection to local/remote fire alarm systems, listed central alarm station(s) or sprinkler preaction/deluge valve actuation.

PART 2 - PRODUCTS

5. SYSTEM DESCRIPTION AND OPERATION

A. The system shall be a Total Flood FM-200 Suppression System supplied by PYROCHEM, or prior approved equal. The system shall provide a FM-200 minimum design concentration of 7.2% by volume for Class A hazards and 9.0% by volume for Class B hazards, in all areas and/or protected spaces, at the minimum anticipated temperature within the protected area. System design shall not exceed 10.5% for normally occupied spaces, adjusted for maximum space temperature anticipated, with provisions for room evacuation before agent release.

B. The system shall be complete in all ways. It shall include all mechanical and electrical installation, all detection and control equipment, agent storage containers, FM-200 agent, discharge nozzles, pipe and fittings, manual release

and abort stations, audible and visual alarm devices, auxiliary devices and controls, shutdowns, alarm interface, caution/ advisory signs, functional checkout and testing, training and all other operations necessary for a functional, UL Listed and/or FM approved FM-200 Clean Agent Suppression System.

C. Provide two (2) inspections during the first year of service. Inspections shall be made at 6-month intervals commencing when the system is first placed into normal service.

D. The General Contractor shall be responsible for sealing and securing the protected spaces against agent loss and/or leakage during the 10-minute "hold" period.

E. The system(s) shall be actuated by a combination of ionization and/or photoelectric detectors installed for maximum area coverage of 250 sq. ft. per detector, in both the room, underfloor and above ceiling protected spaces. If the airflow is one air change per minute, photoelectric detectors only shall be installed for maximum area coverage of 125 sq. ft. per detector. (Ref. NFPA No. 72.)

F. Detectors shall be Cross-Zoned detection requiring two detectors to be in alarm before release.

G. Automatic operation of each protected area shall be as follows:

1. Actuation of one (1) detector, within the system, shall:

    a. Illuminate the "ALARM" lamp on the control panel face.
    b. Energize an alarm bell and/or an optional visual indicator.
    c. Transfer auxiliary contacts which can perform auxiliary system functions such as: i) Operate door holder/closures on access doors, ii) Transmit a signal to a fire alarm system, iii) Shutdown HVAC equipment.
    d. Light an individual lamp on an optional annunciator.

2. Actuation of a 2nd detector, within the system, shall:

    a. Illuminate the "PRE-DISCHARGE" lamp on the control panel face.
    b. Energize a pre-discharge horn or horn/strobe device.
    c. Shut down the HVAC system and/or close dampers.
    d. Start time-delay sequence (not to exceed 60 seconds).
    e. System abort sequence is enabled at this time.
    f. Light an individual lamp on an optional annunciator.

3. After completion of the time-delay sequence, the FM-200 Clean Agent system shall discharge and the following shall occur:

a. Illuminate a "SYSTEM FIRED" lamp on the control panel face.
b. Shutdown of all power to high-voltage equipment
c. Energize a visual indicator(s) outside the hazard in which the discharge occurred.
d. Energize a "System Fired" audible device. (Optional)

4. The system shall be capable of being actuated by manual discharge devices located at each hazard exit. Operation of a manual device shall duplicate the sequence description above except that the time delay and abort functions shall be bypassed. The manual discharge station shall be of the electrical actuation type and shall be supervised at the main control panel.

6. MATERIALS AND EQUIPMENT

A. GENERAL REQUIREMENTS
1. The FM-200 Clean Agent System materials and equipment shall be standard products of the supplier's latest design and suitable to perform the functions intended. When one or more pieces of equipment must perform the same function(s), they shall be duplicates produced by one manufacturer.
2. All devices and equipment shall be UL Listed and/or FM approved.

B. FM-200 AGENT STORAGE AND DISTRIBUTION
1. Each system shall have its own supply of clean agent.
2. The system design can be modular, central storage, or a combination of both design criteria.
3. Systems shall be designed in accordance with the manufacturer's guidelines.
4. Each supply shall be located within the hazard area, or as near as possible, to reduce the amount of pipe and fittings required to install the system.
5. The clean agent shall be stored in PYRO-CHEM Agent Storage Containers. Containers shall be super-pressurized with dry nitrogen to an operating pressure of 360 psi @ 70 ^{o}F (24.8 bar at 20 ^{o}C). Containers shall be of high-strength low alloy steel construction and conform to NFPA 2001.
6. Containers shall be actuated by a resettable electric actuator with mechanical override located at each agent container or connected bank of cylinders. Nonresettable or explosive devices shall not be permitted.
7. Each container shall have a pressure gauge and low pressure switch to provide visual and electrical supervision of the container pressure. The low-pressure switch shall be wired to the control panel to provide an audible and visual "Trouble" alarms in the event the container pressure drops below 247 psi (17 bar). The pressure gauge shall be color coded to provide an easy, visual indication of container pressure.
8. Each container shall have a pressure relief provision that automatically operates before the internal pressure exceeds 750 psi (51.7 bar).
9. Engineered discharge nozzles shall be provided within the manufacturer’s guidelines to distribute the FM-200 agent throughout the protected spaces.

The nozzles shall be designed to provide proper agent quantity and distribution.

a. Nozzles shall be available in 3/8 in. through 2 in. (BPS 10 mm through 50 mm) pipe sizes. Each size shall be available in 180° and 360° distribution patterns.
b. Ceiling plates can be used with the nozzles to conceal pipe entry holes through ceiling tiles.

10. Distribution piping, and fittings, shall be installed in accordance with the manufacturer's requirements, NFPA 2001 and approved piping standards and guidelines. All distribution piping shall be installed by qualified individuals using accepted practices and quality procedures. All piping shall be adequately supported and anchored at all directional changes and nozzle locations.

a. All piping shall be reamed, blown clear and swabbed with suitable solvents to remove burrs, mill varnish and cutting oils before assembly.
b. All pipe threads shall be sealed with Teflon tape pipe sealant applied to the male thread only.

C. CONTROL PANEL

1. The control panel shall be a PCR releasing panel supplied by PYRO-CHEM, or approved equal.
2. The control system and its components shall be UL listed and FM approved for use as a local fire alarm system with releasing device service.
3. The control system shall perform all functions necessary to operate the system detection, actuation and auxiliary functions.
4. The control system shall include battery standby power to support 24 hours in standby and 5 minutes in alarm.
5. The control system shall be microprocessor based utilizing a distributed processing concept. A single microprocessor failure shall not impact operation of additional modules on the system.
6. The control system shall be capable of supporting Cross Zoned Detection.
7. The control system shall supply integrated 2.0 amp power supply circuitry.
8. Each control system shall four (4) initiating circuits.

a. Each circuit shall be capable of Class A (Style D) or Class B (Style A) operation.
b. Each circuit shall be capable of operating up to fifteen (15) approved detectors for thirty (30) detectors per system.
c. Each circuit shall be capable of monitoring contact devices configured for manual release, manual alarm, system abort, trouble input or auxiliary (non-fire) input.

9. Each control shall contain release circuits for activation of an extinguishing/suppression system(s).

    a. Each circuit shall be capable of Class B (Style Y) operation.
    b. Each circuit shall be rated for 1.5 amp @ 24 VDC.

10. Each control system shall contain two (2) indicating appliance circuits for annunciation.

    a. Each circuit shall be capable of Class A (Style B) or Class B (Style Y) operation.
    b. Each circuit shall be rated for 1.5 amp @ 24 VDC.
    11) Each control system shall provide an auxiliary power supply rated for 2 amps @ 24 VDC.

12. Each control system shall provide two (2) SPST relays: one for common alarm and one for common trouble. Four (4) additional programmable relays can be added to each control system by adding an RX2M Relay Module.

D. DETECTORS

1. The detectors shall be spaced and installed in accordance with the manufacturer's specifications and the guidelines of NFPA 72.
2. The Ionization detector shall be a PYRO-CHEM model, or equal in quality, performance and features.
3. The Photoelectric detector shall be a PYRO-CHEM model, or equal in quality, performance and features.

E. MANUAL RELEASE (Electric)

1. The electric manual release switch shall be a dual action device which provides a means of manually discharging the Suppression System when used in conjunction with the control system.
2. The Manual Release switch shall be a PYRO-CHEM model, or equal in quality, performance and features.
3. The Manual Release switch or Manual Pull station shall be a dual action device requiring two distinct operations to initiate a system actuation.
4. Manual actuation shall bypass the time delay and abort functions shall cause the system to discharge and shall cause all release and shutdown devices to operate in the same manner as if the system had operated automatically.
5. A Manual Release switch shall be located at each exit from the protected hazard.

F. ABORT STATION

1. Provide an Abort Station of the "Dead Man" type that shall be located next to each manual switch.
2. The Abort Station shall be a PYRO-CHEM model, or equal in quality, performance and features.
3. The Abort Station shall be supervised and shall indicate a trouble condition at the control panel, if depressed, and no alarm condition exists.
4. "Locking" or "Keyed" abort stations shall not be permitted.

G. AUDIBLE and VISUAL ALARMS

1. Alarm audible and visual signal devices shall operate from the control panel.
2. The Alarm Bell, Alarm Horn and Horn/Strobe devices shall be PYRO-CHEM model, or equal in quality, performance and features.
3. The visual alarm unit shall be a PYRO-CHEM Strobe device, or equal in quality, performance and features.
4. A Strobe device shall be placed outside, and above, each exit door from the protected space. Provide an advisory sign at each light location

H. CAUTION and ADVISORY Signs shall be provided to comply with NFPA 2001 and the recommendations of the FM200 equipment supplier.

1. Entrance sign: (1) required at each entrance to a protected space.
2. Manual discharge sign: (1) required at each manual discharge station.
3. Flashing light sign: (1) required at each flashing light over each exit from a protected space.

I. SYSTEM and CONTROL WIRING

1. All system wiring shall be furnished and installed by the contractor.
2. All wiring shall be installed in electrical metallic tubing (EMT), or conduit, and must be installed and kept separate from all other building wiring.
3. All system components shall be securely supported independent of the wiring. Runs of conduit and wiring shall be straight, neatly arranged, properly supported, and installed parallel and perpendicular to walls and partitions.
4. The sizes of the conductors shall be those specified by the manufacturer. Color-coded wire shall be used. All wires shall be tagged at all junction points and shall be free from shorts, earth connections (unless so noted on the system drawings), and crosses between conductors. Final terminations between the control panel and the system field wiring shall be made under the direct supervision of a factory-trained representative.
5. All wiring shall be installed by qualified individuals, in a neat and workmanlike manner, to conform to the National Electrical Code, Article 725 and Article 760, except as otherwise permitted for limited energy circuits, as described in NFPA 72 -1993 edition. Wiring installation shall meet all local, state, province and/or country codes.
6. The complete system electrical installation, and all auxiliary components, shall

be connected to earth ground in accordance with the National Electrical Code.

PART 3 - EXECUTION

7. SYSTEM INSPECTION and CHECKOUT

   A. After the system installation has been completed, the entire system shall be checked out, inspected and functionally tested by qualified, trained personnel, in accordance with the manufacturer's recommended procedures and NFPA standards.

   B. All containers and distribution piping shall be checked for proper mounting and installation.

   C. All electrical wiring shall be tested for proper connection, continuity and resistance to earth.

   D. The complete system shall be functionally tested, in the presence of the owner or his representative, and all functions, including system and equipment interlocks, must be operational at least five (5) days prior to the final acceptance tests.

      1. Each detector shall be tested in accordance with the manufacturer's recommended procedures, and test values recorded.
      2. All system and equipment interlocks, such as door release devices, audible and visual devices, equipment shutdowns, local and remote alarms, etc. shall function as required and designed.
      3. Each control panel circuit shall be tested for trouble by inducing a trouble condition into the system.

8. TRAINING REQUIREMENTS

   Prior to final acceptance, the installing contractor shall provide operational training to each shift of the owners personnel. Each training session shall include control panel operation, manual and (optional) abort functions, trouble procedures, supervisory procedures, auxiliary functions and emergency procedures.

9. OPERATION and MAINTENANCE

   Prior to final acceptance, the installing contractor shall provide complete operation and maintenance instruction manuals, four (4) copies for each system, to the owner. All aspects of system operation and maintenance shall be detailed, including piping isometrics, wiring diagrams of all circuits, a written description of the system design, sequence of operation and drawing(s) illustrating control logic and equipment used in the system. Checklists and procedures for emergency situations, troubleshooting

techniques, maintenance operations and procedures shall be included in the manual.

10. AS-BUILT DRAWINGS

Upon completion of each system, the installing contractor shall provide four (4) copies of system "As-Built" drawings to the owner. The drawings shall show actual installation details including all equipment locations (i.e.: control panel(s), agent container(s), detectors, alarms, manuals and aborts, etc.) as well as piping and conduit routing details. Show all room or facilities modifications, including door and/or damper installations completed. One (1) copy of reproducible engineering drawings shall be provided reflecting all actual installation details.

11. ACCEPTANCE TESTS

A. At the time "As-Built" drawings and maintenance/operations manuals are submitted, the installing contractor shall submit a "Test Plan" describing procedures to be used to test the control system(s). The Test Plan shall include a step-by-step description of all tests to be performed and shall indicate the type and location of test apparatus to be employed. The tests shall demonstrate that the operational and installation requirements of this specification have been met. All tests shall be conducted in the presence of the owner and shall not be conducted until the Test Plan has been approved.

B. The tests shall demonstrate that the entire control system functions as designed and intended. All circuits shall be tested: automatic actuation, solenoid and manual actuation, HVAC and power shutdowns, audible and visual alarm devices and manual override of abort functions. Supervision of all panel circuits, including AC power and battery power supplies, shall be tested and qualified.

C. A room pressurization test shall be conducted, in each protected space, to determine the presence of openings which would affect the agent concentration levels. The test(s) shall be conducted using the Retro-Tec Corp. Door Fan system, or equivalent, with integrated computer program. All testing shall be in accordance with NFPA 2001, Appendix B.

D. If room pressurization testing indicates that openings exist which would result in leakage and/or loss of the extinguishing agent, the installing contractor shall be responsible for coordinating the proper sealing of the protected space(s) by the general contractor or his sub-contractor or agent. The general contractor shall be responsible for adequately sealing all protected space(s) against agent loss or leakage. The installing contractor shall inspect all work to ascertain that the protected space(s) have been adequately and properly sealed. THE SUPPRESSION SYSTEM INSTALLING CONTRACTOR SHALL BE RESPONSIBLE FOR THE SUCCESS OF THE ROOM PRESSURIZATION TESTS. If the first room pressurization test is not successful, in accordance with these specifications, the installing contractor shall direct the general contractor to

determine, and correct, the cause of the test failure. The installing contractor shall conduct additional room pressurization tests, at no additional cost to the owner, until a successful test is obtained. Copies of successful test results shall be submitted to the owner for record. 5) Upon acceptance by the owner, the completed system(s) shall be placed into service.

12. SYSTEM INSPECTIONS

A. The installing contractor shall provide two (2) inspections of each system, installed under this contract, during the one-year warranty period. The first inspection shall be at the six-month interval, and the second inspection at the 12-month interval, after system acceptance. Inspections shall be conducted in accordance with the manufacturer's guidelines and the recommendations of NFPA 2001.

B. Documents certifying satisfactory system(s) operation shall be submitted to the owner upon completion of each inspection.

13. WARRANTY

All system components furnished and installed under this contract shall be warranted against defects in design, materials and workmanship for the full one (1) year from the date of system acceptance.

END OF SECTION

SECTION 15800 - HEATING, VENTILATION AND AIR CONDITIONING

PART 1 – GENERAL

1. RELATED DOCUMENTS

A. The General Provisions of the Contract, including General and Supplementary Conditions and General Requirements apply to the work specified in this Section.

B. Refer to Basic Materials and Methods Section 15050 which shall apply to work in this Section.

2. DESCRIPTION OF WORK

A. The work to be done under this Section includes the furnishing of all labor, tools, materials, equipment and services necessary for and reasonable incidental to the installation of complete air conditioning and heating and ventilation equipment as shown on plans and herein specified, excepting only work and/or materials indicated as being done and/or furnished under other sections.

B. Contractor shall refer to other Sections of the Specifications which may be applicable to or associated with this Section.

3. RELATED WORK SPECIFIED IN OTHER SECTION

A. Electrical Section will provide all power wiring including furnishing and installing of disconnect switches where specified. Control wiring for air conditioning equipment shall be provided under this Section.

B. Other Sections will provide and install structural supports for equipment. These supports must be checked and coordinated by this Section so that they suit the equipment which is to be supported.

C. Other Sections will provide all platforms slabs, lintels and curbs, as directed by this Section, to accommodate the mechanical equipment.

D. Mechanical Contractor shall provide starters for motors furnished under this Section.

4. QUALITY ASSURANCE

A. These specifications with accompanying drawings, require complete apparatus, fully erected and in successful operating condition. Perform all work in best, most substantial manner.

B. All equipment furnished and installed under this Section shall be U.L. approved and labeled where applicable.

C. All unfired pressure vessels furnished under this Section shall be ASME and National Board stamped.

D. All manufacturers products shall comply with the requirements of this Section.

5. SUBMITTALS

A. Contractor, before beginning work, shall submit dimensional shop drawings (in accordance with requirements of Division 1), for approval, for all duct systems, and equipment layout. Contractor is responsible to coordinate all plumbing, piping sprinkler, ductwork and electrical to avoid all conflicts. Conflicts encountered after work has started will be corrected at Contractor's expense.

B. Where the equipment installed is of a different configuration and/or size than that shown on the drawings, Contractor shall assume all responsibility to conform with the intent of the contract documents. The Architect shall be advised of any changes and deviations for his approval. The same shall be true for any field modification required because of "on job" construction conditions.

PART 2 - PRODUCTS

6. HVAC DUCTWORK

A. Provide and install a complete system of ductwork as herein specified to include, but not limit to supply, return, exhaust and fresh air with grilles, registers, diffusers and appurtenance to provide a complete functional and operational system. Duct sizes shown on drawings are free area dimensions. Design shall be as described in the latest edition of SMACNA manuals and as per the following:

1. Galvanized sheet metal shall be lock form quality per ASTM A653 with a G90 zinc coating.

2. Outside air and exhaust air ducts shall be galvanized sheetmetal with air-tight seams and as per applicable sections of SMACNA manuals for low velocity ducts. Insulate outside air and exhaust air ducts with 2” exterior duct wrap.

3. Supply and return ducts for low pressure system and, low velocity systems shall be galvanized sheetmetal with airtight seams and as per applicable section of SMACNA manuals for low velocity ducts. All ducts shall be insulated with 2" exterior wrap as per Section 15250.

4. Rectangular ductwork for medium pressure, high velocity systems shall be galvanized sheetmetal with airtight seams and as per applicable section of SMACNA manuals for high velocity ductwork. Insulate with 2" exterior duct wrap as per Section 15250.

5. Concealed Round rigid ductwork shall be all round single wall spiral pipe and fittings, galvanized steel, as per applicable sections of SMACNA manuals for high velocity duct. Insulate with 2" exterior duct wrap as per Section 15250. Seal all seams, joints and wall penetrations with Hardcast as herein specified.

6. Round and oval rigid duct, where exposed and/or noted, or detailed, on the drawings, shall be double wall and shall be constructed of perforated inner liner, a 1” layer of fiberglass insulation, and an outer pressure shell. Ductwork shall be of spiral lockseam construction fabricated in accordance with ASTM-A527 Standards. Seal all seams, joints, and wall penetrations with Hardcast elastomeric tape as here-in-before specified. Ductwork shall be paint grip galvanized steel. Provide welded factory insulated supply taps as indicated on the drawings. Minimum steel gauges, hanger spacing, support sizes and attachments, and reinforcement shall be SMACNA Duct Construction Standards. Insulate all register taps.

7. Round and oval rigid duct, where exposed and/or noted on the drawings, shall be double wall and shall be constructed of perforated inner liner, a 1” layer of fiberglass insulation, and an outer pressure shell. Ductwork shall be of spiral lockseam construction fabricated in accordance with ASTM-A527 Standards. Seal all seams, joints, and wall penetrations with Hardcast elastomeric tape as here-in-before specified. Ductwork shall be paint grip galvanized steel. Provide welded factory insulated supply taps as indicated on the drawings. Minimum steel gauges, hanger spacing, support sizes and attachments, and reinforcement shall be SMACNA Duct Construction Standards. Insulate all register taps.

8. All ducts shall be sealed per SMACNA Seal Class A. All joints, longitudinal seams and wall penetrations of all supply, return outside air and exhaust ducts shall be sealed with an elastomeric tape which shall consist of a pressure sensitive layer of modified butyl rubber sealer laminated to a foil backing material which shall conform to surface variations and irregular areas and shall not harden crack or peel. The sealant shall be waterproof and shall be a minimum of 15 mils thick. All ductwork shall be cleaned and prepared and sealant shall be applied strictly in accordance with manufacturer's instructions and recommendations. Sealant shall be Hardcast FG-1402, Suretape #653 or approved equal, at Contractor’s option flanged gasketed duct system may be used for <u>POSITIVE PRESSURE SYSTEM ONLY</u>.

9. Flexible round duct where indicated on plans shall be listed by Underwriters' Laboratories, Inc., under UL-181 standards as Class I flexible Air Duct Material complying with NFPA Standards 90A. Ducts shall be rated on maximum pressure of 6 inches WG positive and 2 inches WG negative. The duct shall be factory fabricated assembly composed of: an inner duct of woven and coated fiberglass providing an air seal and bonded permanently to corrosion resistant coated steel wire helix: a 2" thick fiberglass insulating blanket and low permeably outer vapor barrier of fiberglass reinforced metalized film laminate. Pressure drop not to exceed .15" SP at 500 Fpm through 6" or larger duct. Maximum length of flexible duct shall not exceed 8'-0". Connect flexible round duct with ½" wide nylon positive locking nylon straps on inner duct and outer duct.

10. Splitter dampers shall be installed where branches take off of main trunk ductwork, where ducts divide or where shown on the drawings. Splitters shall be fitted with nickel plated damper regulators in finished areas. Splitters shall be factory fabricated in accordance with SMACNA Duct Construction Standards.

B. Flexible connections shall be provided between each fan unit and ductwork on supply side and also on return side. Material shall be flexible fire-resistive material, minimum 4" wide, UL listed, with no metal to metal contact.

C. Duct supports for rectangular ducts shall be a minimum 1" X 18 gauge galvanized steel bands. Hanger bands shall be bent under lower corners and secured with self-tapping screws at corners and six (6") inch intervals up the sides. Distance between hangers shall be as recommended by SMACNA manual for low and medium ductwork. Ductwork shall be rigidly supported to prevent vibration. Duct attachments to structure, lower hanger attachments, ducts traps and rods and trapeze angles shall be in accordance with SMACNA Low Pressure and High Pressure Duct Standards.

D. Where the ducts pass through walls, draft stops or partitions, the space shall be packed with non-combustible materials, filling all voids around duct.

E. Fire dampers with fusible links shall be installed at all points where ductwork penetrates fire rated walls, floors and ceilings, as required by NFPA, 90-A, AND the International Mechanical Code, weather indicated on drawings or not. Sheet Metal Contractor shall review ALL drawings and include these fire damper costs in his bid. No additional compensation shall be allowed for failure to be so informed.

F. Provide radius elbows unless specifically indicated otherwise or space prohibitive. Rectangular radius elbows shall be factory fabricated with a centerline radius of not less than the width of the duct. Round duct elbows shall have a minimum center line radius of 1-1/2 times the diameter of the duct and

shall be smooth where possible. Provide square elbows where indicated or space prohibits the use of radius elbows. Square elbows shall be factory fabricated with double thickness airfoil turning vanes pre-assembled and securely attached to runners.

G. In general, vertical risers and other duct runs, where the method of support specified above is not applicable, or not specifically detailed on drawings, shall be supported by substantial angle brackets designed to meet field conditions, installed to allow for duct expansion and approved by Architect.

H. Provide exposed operators for operation of dampers and splitters in inaccessible ceilings, operators shall be chrome plated.

I. Maximum duct leakage shall be +/- 5%, SMACNA Seal Class A. Ductwork between VAV box and air-handling unit shall be designed for 4.0" static pressure. Ductwork between VAV box and diffuser shall be designed for 2.0" static pressure. Outside air, return air and exhaust air systems shall be designed for 2.0" static pressure. Construct ductwork in accordance with SMACNA Duct Construction Standards for the specified pressure class.

J. Install Automatic dampers, airflow stations and other duct mounted devices required by Section 15950.

K. Smoke dampers shall be UL 555S/UL555 combination fire/smoke damper with integral 120V actuator. Dampers shall be automatic reset type. Control and power wiring by Fire Alarm Contractor.

L. Flanged gasketed exhaust and return ductwork will not be accepted.

7. DIFFUSERS, GRILLES, REGISTERS AND LOUVERS

A. All sizes shall be as indicated on drawings.

B. All outlets shall be balanced to obtain specific air quantities free of all objectional draft and Noises.

C. Diffusers, grilles and registers shall be of normal commercial grade as indicated on Schedule on drawings.

D. Louvers shall be as scheduled and/or detailed on drawings.

E. Insulate the back of all diffusers, grilles and registers with ¾" Armaflex or Rubertex with vapor barrier, as detailed on the drawings.

8. FIRE DAMPERS

Fire dampers shall be solid sheet curtain type, dynamic closure type corrosion resistant galvanized steel construction. Dampers mounted in the horizontal position shall be closed by a stainless steel negate spring. Damper to be easily reset through standard access panel for required periodic maintenance. Access panels are required for access to all fire dampers, size 12 X 12 inches. Dampers shall be 100% out of air stream. Fully insulate all fire damper installations to prevent condensation.

9. ACCESS DOORS

Access doors shall be installed in ductwork wherever required for ready access to any operating part. Doors shall not be smaller than 12 X 12 inches, with brass hinge and sash type fasteners.

10. PIPING AND FITTINGS

A. Furnish and install all piping related to air conditioning systems including make-up water piping, air conditioning condensation drains, and other miscellaneous piping.

B. All piping shall be installed parallel and square with building lines and shall be sloped to permit drainage, with suitable provision for drainage at all low points.

C. Piping shall be arranged to maintain headroom and keep passageways clear and where necessary shall be offset to maintain the required clearance and conform with the structural features of the building. Contractor shall determine in advance of construction locations for all piping sleeves, hangers, etc. No allowance will be made for extra due to inaccurate location of sleeves, piping or equipment.

D. All piping shall have provisions for expansion and contraction with anchorage at each point shown on the plans and/or as required.

E. Full length pipe shall be used where possible, short lengths and couplings will not be permitted. After cutting, all pipes shall be reamed out to full bore and before erection, all cutting and foreign matter shall be removed from the inside of pipes. Screwed joints shall be made tight without caulking or the use of lead or paint and no lubricant shall be used except flake granite and cylinder oil paste, or approved pipe compound applied to make threaded pipe.

F. Pipe sleeves shall be provided for the passage of all pipe through walls, floors and partitions.

G. All condensate drain piping shall be installed using ASTM B88 type "L" hard drawn copper with wrought copper sweat fittings. Changes in direction of piping

shall be made with short turn tee pattern or 45 degree wye fittings with brass cleanout plug. Insulate drain piping per Section 15250, minimum drain on fan coil units – 3/4", air handling units – 1-1/4".

H. Make-up water piping shall be installed using copper piping as specified for water piping.

I. Welding fittings shall be Tube Turn, Midwest, or approved equal. Use welding elbows at all turns in welded piping, except where bent runs are indicated and except that turns and off-setting to a maximum of 15 degrees mitered. At branch connections, either use welding tees or weld the branches directly into the mains. Use extra heavy couplings in all cases where female threaded openings are required, in welding piping.

J. Chilled water piping, 2-1/2" and larger shall be installed using ASTM A53 Grade B Schedule 40 black steel pipe with malleable iron fittings. At Contractor's option size three (3") inches and larger may be flanged or welded. Welded elbows shall be factory made long radius. Provide bronze unions at connections to copper coils. Also, at Contractor's option all water piping, above ground, may be installed using grooved mechanical pipe coupling and fittings, with grade "E" gaskets. Piping 2" and smaller shall be ASTMB88 type "L" hard drawn copper with wrought copper sweat fittings.

K. Install control valves, sensor wells, sockets, flow meters and DP sensors required by Section 15950.

L. See Section 15900 for valves, fittings, unions, gaskets, bolts and nuts.

M. See Section 15050 for hangers.

11. PIPING IDENTIFICATION

All piping at each piece of equipment shall be stencil to show the service and direction of flow. Stencils shall be black on a white background with letters one (1") inch high spaced at approximately forty-eight (48") inches apart. Pressure-sensitive pipe markers ANSI Standard A 13.1 may be used in lieu of stenciling.

12. EXHAUST FANS AND OUTSIDE AIR INTAKES

Size and quantity shall be provided as indicated on drawings.

13. MOTOR STARTERS

A. Mechanical Contractor shall provide motor starters for all three phase motors furnished under this section. Starters shall be manufactured to the following standards unless otherwise noted: ANSI/NFPA-70 National Electric Code, L 508 and UL 508A Industrial Control Equipment, NEMA ICS-2 – 2000 and IEC 60947-5, 60947-4 and 60947-3.

B. Magnetic Motor Starters shall be enclosed in a general purpose electrical enclosure with the appropriate environmental rating (Nema 1 for indoors, Nema 3R, 4, 12 for outdoors). Two-speed starters with time delay relays shall be used for two-speed motors. All motors over 25 HP shall use solid state reduced voltage starters.

C. Enclosed combination starters shall include all of the magnetic starter requirements in addition to a disconnecting method. Acceptable disconnects include: motor circuit protectors, UL 489 circuit breakers, or a fused disconnects. All disconnects shall include a lock-out mechanism when in the off position.

D. The Motor Circuit protector shall be a UL listed 508 current limiting manual motor starter with magnetic trip elements only. The breaker shall carry a UL 508F rating (up to 100A frame size) which provides for coordinated short circuit rating for use with the motor contactor and provides a minimum interrupting rating of 30,000 AIC for the combination starter.

E. Fused disconnect shall be UL 98 suitable for service entrance protection. It shall accommodate time delay J-style fuses.

F. UL 489 breaker shall include thermal and magnetic trip mechanisms.

G. Starters shall consist of a horsepower rated magnetic contactor with a minimum of 1NO and 1NC auxiliary contacts and solid state electronic overload relay. Overload relay shall protect all three phases with a wide range current setting and trip class to allow field adjustment for specific motor FLA. Interchangeable heater elements are not acceptable. Overload relay shall provide phase failure, phase loss, locked rotor and stall protection.

H. Provide a manual reset pushbutton on the starter cover to restore normal operation after a trip or fault condition.

I. Each starter shall include an installed minimum 50VA control power transformer (CPT) with protected secondary. The CPT must accept the available line voltage and the control voltage shall not exceed 120V.

J. Each starter shall include a Hand-Off-Auto switch and pilot light indicators for Hand, Off, Auto, Run and Overload conditions. All pilot devices shall be water tight and dust tight.

K. When remotely controlled by an automation system, the starter shall include remote run terminals which accept both a voltage input signal and a contact closure. The voltage run input shall accept both AC and DC signals including 24VAC, 120VAC, 24VDC and 48VDC to allow direct connection of the transistorized automation signal to the starter.

L. The starter shall provide a provision for Fireman's Override operation. When activated, the starter shall run the motor in any mode (Hand, Off or Auto) regardless of other inputs or lack of inputs either manual or auto. The purpose of the Fireman's Override input is to act as a smoke purge function. Fireman's Override has priority over the Emergency Shutdown input.

M. If the starter is controlled by a fire alarm or life safety system, the starter shall include an Emergency Shutdown input which will disable the starter from operating in either Hand or Auto mode regardless of other inputs either manual or auto.

N. Manufacturer shall provide a five year warranty on the complete starter assembly.

O. Starters shall be GE Model 300 Series or Cerus Industrial BAS Series.

14. AIR-COOLED SCROLL CHILLER

A. Provide and install as shown on the plans factory-assembled, factory-charged, and factory-tested air-cooled scroll compressor packaged chiller, with capacities and accessories as scheduled on the drawings and as here in after specified. Chiller shall consist of hermetic scroll compressor sets, direct expansion evaporator, air-cooled condenser section, microprocessor-based control system and all components necessary for controlled unit operation. The chiller shall be capable of stable operation to a minimum of 25 percent of full load without hot gas bypass. Performance shall be in accordance with ARI Standard 550/590. Chiller shall be provided with compressor sound blankets. Chiller shall be McQuay International, or approved equal.

B. Unit shall be provided with a pump package consisting of the following:
   1. Standard Dual (Primary/Standby) Pumps rated for 150 psi, chiller mounted, with each pump having a capacity of 365 GPM with 110 ft of total head. Pumps shall be Armstrong Series Closed coupled vertical Centrifugal Dual Arm pump or equal.
   2. Suction guide with strainer and start up strainer.
   3. Pumps factory tested to Hydraulic Institute Standards.
   4. Insulation on pump and inlet evaporator components.

5. Pressure/Temperature taps (3) shall be factory installed to measure the pressure differential across the pump and strainer.
6. Dual pump will allow for servicing of one pump without draining water loop.
7. Electric freeze protection.
8. Flow sensor mounted and wired to chiller.
9. Triple duty Valve.
10. Single point power source for chiller and pump package.

B. The compressors shall be sealed hermetic, scroll type with crankcase oil heater and suction strainer. Compressor shall have a forced-feed lubrication system with a reversible oil pump and oil charge. The compressor motor shall be refrigerant gas cooled, high torque, hermetic induction type, two-pole, with inherent thermal protection on all three phases and shall be mounted on RIS vibration isolator pads.

C. The evaporator shall be direct expansion, U-tube type with water flowing in the baffled shell side and refrigerant flowing through the tubes. Two independent refrigerant circuits within the evaporator serve the unit's dual refrigerant circuits. The evaporator shall have a carbon steel shell and seamless high efficiency copper tubes roller expanded into a carbon steel tube sheet. For drainage, 3/8" vent and drain plugs shall be provided on the top and bottom of the shell. The evaporator shall have an electric resistance immersion heater and be insulated with 3/4" thick vinyl nitrate polymer sheet insulation, protecting against water freeze-up at ambient air temperatures to -20°F . A fluid thermostat shall control the heater. The fitted and glued-in-place insulation shall have a K factor of at least 0.28 at 75°F. The water side working pressure shall be 150 psig. Each evaporator shall be designed, constructed, inspected, and stamped according to the requirements of the ASME Boiler and Pressure Vessel Code. Double thickness insulation is available as an option.

D. The condenser coils shall consist of 3/8 inch seamless copper tubes mechanically bonded into plate-type aluminum fins with precoated black fin coating. The fins shall have full drawn collars to completely cover the tubes. A subcooling coil shall be an integral part of the main condenser coil. Condenser fans shall be propeller type arranged for vertical air discharge and individually driven by direct-drive fan motors. They shall be equipped with a heavy-gauge fan guard. Fan motors shall be TEAO, three-phase, direct-drive, 1140 rpm.

E. Each of the two refrigerant circuit shall include a refrigerant filter-drier, sight glass with moisture indicator, liquid line solenoid valve (no exceptions), thermal expansion valve, and insulated suction line.

F. Unit casing and all structural members and rails shall be fabricated of steel and painted to meet ASTM B117, 500-hour salt spray test.

G A centrally located weatherproof control panel shall contain the field power connection points, control interlock terminals, and control system. Power and starting components shall include factory circuit breaker of fan motors and control circuit, individual contactors for each fan motor, solid-state compressor three-phase motor overload protection, inherent fan motor overload protection and unit power terminal blocks for connection to remote disconnect switch. Terminals shall also be provided for power supply to the evaporator heater circuit. Hinged access doors shall be lockable. Barrier panels or separate enclosures are required to protect against accidental contact with line voltage when accessing the control system. An advanced DDC microprocessor unit controller with a 4-line by 20-character liquid crystal display shall provide the operating and protection functions. The controller shall take pre-emptive limiting action in case of high discharge pressure or low evaporator pressure. The controller shall contain the following listed features as a minimum:

1. The unit shall be protected in two ways: (1) by alarms that shut the unit down and require manual reset to restore unit operation and (2) by limit alarms that reduce unit operation in response to some out-of-limit condition. Shut down alarms shall activate an alarm signal.
2. Shutdown Alarms

No evaporator water flow	Sensor failures
Low evaporator pressure	Evaporator freeze protection
High condenser pressure	Outside ambient temperature
Motor protection system	Phase voltage protection

3. Limit Alarms
   Condenser pressure stage down, unloads unit at high discharge pressures
   Low ambient lockout, shuts off unit at low ambient temperatures
   Low evaporator pressure hold, holds stage #1 until pressure rises
   Low evaporator pressure unload, shuts off one compressor
4. Unit Enable Selection shall enable unit operation from either local keypad, digital input, or BAS.
5. Unit Mode Selection shall select standard cooling, ice, glycol, or test operation mode.
6. Analog Inputs shall reset leaving water temperature, 4-20 mA.
7. Digital Inputs shall be:
   Unit off switch
   Remote start/stop
   Flow switch
   Ice mode switch, converts operation and setpoints for ice production
   Motor protection
8. Digital Outputs shall be:
   Shutdown alarm; field wired, activates on an alarm condition, off when alarm is cleared
   Evaporator pump; field wired, starts pump when unit is set to start
9. Condenser fan unit controller shall provide control of condenser fans based on compressor discharge pressure.

10. Building Automation System (BAS) Interface shall be Factory mounted DDC controller(s) and shall support operation on a BACnet®, Modbus® or LonMark ® network via one of the data link / physical layers listed below as specified by the successful Building Automation System (BAS) supplier.
    BACnet MS/TP master (Clause 9)
    BACnet IP, (Annex J)
    BACnet ISO 8802-3, (Ethernet)
    LonMark FTT-10A. The unit controller shall be LonMark® certified.
11. The information communicated between the BAS and the factory mounted unit controllers shall include the reading and writing of data to allow unit monitoring, control and alarm notification as specified in the unit sequence of operation and the unit points list. For chillers communicating over a LonMark network, the corresponding LonMark eXternal Interface File (XIF) shall be provided with the chiller submittal data.
12. All communication from the chiller unit controller as specified in the points list shall be via standard BACnet objects. Proprietary BACnet objects shall not be allowed. BACnet communications shall conform to the BACnet protocol (ANSI/ASHRAE135-2001). A BACnet Protocol Implementation Conformance Statement (PICS) shall be provided along with the unit submittal.

H. The following options are to be included:

1. Low ambient head pressure control to 0°F with fan speed control
2. Single-point connection, non-fused disconnect switch with through-the-door handle and compressor circuit breakers
3. Protective and decorative louvers for upper section of the unit, covering the coils and end of the unit
4. Protective and decorative louvers for lower section of the unit
5. Chilled water flow switch to be factory mounted in the chilled water outlet nozzle and factory wired to terminals in the control panel.
6. Spring vibration isolators for field installation
7. Double evaporator insulation
8. Compressor sound reduction package
9. 115-volt convenience outlet mounted in control panel

I. Unit shall be installed in strict accordance with manufacturer’s requirements, shop drawings, and contract documents. Contractor shall, adjust and level chiller in alignment on supports, Coordinate electrical installation with electrical contractor, and coordinate controls with control contractor.

J. Start up shall include the proper charge of refrigerant and oil. Contractor shall provide testing and starting of machine, and instruct the Owner in its proper operation and maintenance.

K. The refrigeration equipment manufacturer’s guarantee shall be for a period of five year from date of equipment acceptance. The Five year parts labor and

refrigerant warranty shall provide for repair or replacement due to failure by material and workmanship that prove defective within the above period, including refrigerant. Five year parts labor and refrigerant warranty.

15. COMPRESSION TANKS

A. Furnish and install tanks of the size and type as shown on the plans. Tanks shall be bladder type.

B. Tanks shall be designed and constructed per ASME Section VIII, Division I and rated for a maximum working pressure of 125 PSI at 240 F. Units shall be furnished with lifting rings, and have the system connection and charging valve at the tank top and a tank drain connection at the bottom. Tanks shall have an internal replaceable elastomer bladder with the minimum acceptance volume and factory precharge pressure as shown on the plans. The bladder shall be suitable for a maximum system operating temperature of 240 F. Bladder type tanks shall be furnished with a steel base.

C. Tanks shall be furnished with galvanized cover for corrosion resistance.

D. Insulate all tanks as required in Section 15250.

16. AIR SEPARATOR

A. Furnish and install air separation devices of a size and capacities as shown on the plans.

B. Air separators shall be constructed of steel designed and fabricated per ASME Section VIII Division I with a maximum working pressure rating of 125 PSIG at 375 F. Units up to 2-1/2” connection sizes shall have threaded connections and units 3” and above connection sizes shall have flanged connections. Units shall have separate top connections for system expansion tank and air venting, and bottom connection for blowdown cleaning.

C. Air separators shall be furnished with a removal stainless steel strainer with a free area not less than five times the cross-sectional area of the connecting pipe.

D. Insulate all separators as required in Section 15250.

17. WATER TREATMENT

A. Contractor to furnish and install necessary equipment to properly treat the chilled water circulating system. Manufacturers shall be K-2 Chem., Nalco, or equal.

B. Furnish and install high pressure “pot type” feeders interconnected across chilled water circulating pumps. Treatment shall be film forming type capable of

maintaining adequate corrosion and sludging protection. Include 55 gallons Closed System Treatment in highly concentrated liquid form, basically Nitrite-Metallic Polyphosphate formulated to meet local water conditions.

C. Flush out system and remove pipe scale and oily residue, furnish Pre-Start-Up chemical to be used under direct supervision of chemical company representative. This shall be done after all pipe is completed and tested, prior to operation and initiation of regular chemical feeding.

D. Provide complete printed instructions for chemical dosages, bleed rates, operation, to simplify operation and set a standard for treatment. Services of factory trained Engineer shall be included for setting up procedures and instructing personnel in proper handling of chemicals based on actual analysis of water supply. Complete test sets for checking PH, Alkalinity, Chloride, Hardness, Nitrite, Organic Phosphonate shall be included with all required reagents and instructions. Factory check analysis and supervision of chemical use and test shall be included for first year's operation.

E. This Contractor shall furnish and install all piping connections, taps and shut off valves to accommodate all the equipment and piping. Contractor shall certify piping is clean and free of air.

18. AIR HANDLING UNITS

A. Air handling unit shall be furnished with; double width, double inlet (DWDI) fans; chilled water cooling coils; double wall casings; angular filter box; and mixing box. Each unit shall have the arrangements, capacities and characteristics as shown on the drawings. Units shall, be as manufactured by McQuay "Vision" Air Handler, or prior approved equal.

B. Units shall have heavy gauge channel posts and panels secured with mechanical fasteners. All panels, access doors, and ship sections shall be sealed with permanently applied bulb-type gasket. Shipped loose gasketing will not be accepted.

C. Panels and access doors shall be constructed as a 2-inch nominal thick; thermal broke double wall assembly, injected with foam insulation with an R-value of not less than R-13. Fiberglass matt insulation will not be accepted. The outer, inner, and floor panels shall be constructed of G90 galvanized steel. Unit will be furnished with solid inner liners.

D. Panel deflection shall not exceed L/240 ratio at 125% of design static pressure, maximum 5 inches of positive or 6 inches of negative static pressure. Deflection shall be measured at the panel midpoint.

E. The casing leakage rate shall not exceed .5 cfm per square foot of cabinet area at 5 inches of positive static pressure or 6 inches of negative static pressure.

F. Module to module field assembly shall be accomplished with an overlapping, full perimeter internal splice joint that is sealed with bulb type gasketing on both mating modules to minimize on-site labor and meet indoor air quality standards.

G. Access doors shall be flush mounted to cabinetry, with minimum of two six inch long stainless steel piano-type hinges, latch and full size handle assembly. Access doors shall swing outward for unit sections under negative pressure. Access doors on positive pressure sections, shall have a secondary latch to relieve pressure and prevent injury upon access.

H. A formed G60 galvanized steel base rail shall be provided by the unit manufacturer for structural rigidity and condensate trapping.. The base rail shall be constructed with 12-gauge. The required height of the baserail, to allow for adequate drainage, shall be 4” plus the total unit static pressure measured in inches. Should the unit baserail not be factory supplied at this height, the contractor is required to supply an additional pad to make up the difference.

I. Fan assembly shall be a double width, double inlet, class II, belt-drive type housed forward curved dynamically balanced as an assembly. Maximum fan RPM shall be below first critical fan speed. Fan assemblies shall be dynamically balanced by the manufacturer on all three planes and at all bearing supports. Copper lubrication lines shall be provided and extend from the bearings and attached with grease fittings to the fan base assembly near access door. If not supplied at the factory, contractor shall mount copper lube lines in the field. Fan and motor shall be mounted internally on a steel base. Motor shall be Factory mounted on a slide base that can be slid out the side of unit if removal is required. Provide access to motor, drive, and bearings through hinged access door.

J. Fan and motor assembly shall be mounted on 2" deflection spring vibration type isolators inside cabinetry.

K. Basic load rating shall be computed in accordance with AFBMA - ANSI Standards. The bearings shall be designed for service with an L-50 life of 200,000 hours and shall be a heavy duty pillow block, self-aligning, grease-lubricated ball or spherical roller bearing type.

L. Shafts shall be solid, hot rolled steel, ground and polished, keyed to shaft, and protectively coated with lubricating oil. Hollow shafts are not acceptable.

M. V-Belt drives shall be cast iron or steel sheaves, dynamically balanced, bored to fit shafts and keyed. Fixed sheaves, matched belts, and drive rated based on motor horsepower. Minimum of 2 belts shall be provided on all fans with 10 HP

motors and above. Standard drive service factor minimum shall be 1.1 S.F. for 1/4 HP – 7.5 HP, 1.3 S.F. for 10 HP and larger, calculated based on fan brake horsepower.

N. Fan motors shall be manufacturer provided and installed, Open Drip Proof, premium efficiency (meets or exceeds EPA requirements), 1750 RPM, single speed. Complete electrical characteristics for each fan motor shall be as shown in schedule. Motors shall be capable of being controlled by Variable Frequency Drives on the variable air volume units as shown on the drawings.

O. Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclosed terminal lugs in terminal box sized to NFPA 70.

P. Water cooling coils shall be provided in units as scheduled on the drawings. Provide access to coils for service and cleaning. Enclose coil headers and return bends fully within unit casing. Unit shall be provided with coil connections that extend a minimum of 5" beyond unit casing for ease of installation. Drain and vent connections shall be provided exterior to unit casing. Coil connections shall be factory sealed with grommets on interior and exterior panel liners to minimize air leakage and condensation inside panel assembly. If not factory packaged, Contractor shall supply all coil connection grommets and sleeves. Coils shall be removable through side and/or top panels of unit without the need to remove and disassemble the entire section from the unit.

1. Headers shall consist of seamless copper tubing to assure compatibility with primary surface. Headers shall have intruded tube holes to provide maximum brazing surface for tube to header joint, strength, and inherent flexibility. Header diameter shall vary with fluid flow requirements.
2. Fins shall have a minimum thickness of 0.0075 inch aluminum plate construction. Fins shall have full drawn collars to provide a continuous surface cover over the entire tube for maximum heat transfer. Tubes shall be mechanically expanded into the fins to provide a continuous primary to secondary compression bond over the entire finned length for maximum heat transfer rates. Bare copper tubes shall not be visible between fins.
3. Coil tubes shall be 5/8 inch OD seamless copper, 0.020 inch nominal tube wall thickness, (½ inch OD tubes will not be acceptable) expanded into fins, brazed at joints. Soldered U-bends shall be provided to minimize the effects of erosion and premature failure having a minimum tube wall thickness of .025 inches.
4. Coil connections shall be carbon steel, NPT threaded connection. Connection size to be determined by manufacturer based upon the most efficient coil circuiting. Vent and drain fittings shall be furnished on the connections, exterior to the air handler. Vent connections provided at the highest point to assure proper venting. Drain connections shall be provided at the lowest point to insure complete drainage and prevent freeze-up.
5. Coil casing shall be a formed channel frame of stainless steel.

Q. Furnish flat filter in mixing box section with 2-inch pleated MERV 11 filter. Provide side loading and removal of filters. Filter media shall be UL 900 listed, Class I or Class II.

R. Mixing box section shall be provided with end outside air opening and top return air opening with parallel low leak airfoil damper blades. Dampers shall be hollow core galvanized steel airfoil blades, fully gasketed and have continuous vinyl seals between damper blades in a galvanized steel frame. Dampers shall have stainless steel jamb seals along end of dampers. Linkage and ABS plastic end caps shall be provided when return and outside air dampers sized for full airflow. Return and outside air dampers of different sizes must be driven separately. Damper Leakage: Leakage rate shall be less than two tenths of one percent leakage at 2 inches static pressure differential. Leakage rate tested in accordance with AMCA Standard 500.

S. Units shall be installed in accordance with manufacturer's Installation & Maintenance instructions. Do not operate units for any purpose, temporary or permanent, until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation.

T. After acceptance provide one extra set of filters for each unit.

19. ELECTRIC DUCT HEATING COILS

A. Furnish and install steel finned tubular electric elements duct heater, mounted in corrosion resistant steel frame for slip in installations. Heaters shall have capacities and requirements as scheduled on the drawings, shall be as manufactured by Indeeco, or approved equal.

B. Heaters shall be in compliance with the National Electric Code and shall be U.L. listed for zero clearance to combustible surfaces.

C. Heaters shall be rated for the KW, voltage, phase and number of heating stages or SCR control as indicated in the schedule on the drawings. All three phase heaters shall have equal balanced three phase stages. Heaters shall be specifically designed for the air flow direction and terminal box overhang required to meet the installation location on the drawings.

D. Heaters shall be furnished with triple over-temperature thermal cutout protection, air flow switch, magnetic contactors, fuses (if over 48 amps) control circuit transformer, door interloc disconnect switch and insulated terminal box.

E. Terminal blocks shall be provided for all field wiring and shall be sized for installation of 75 degrees C copper wire in accordance with NEC requirements.

20. VAV TERMINAL UNITS

A. Furnish and install Variable Air Volume Terminal Units of the size, capacity, and performance as shown on the plans. Boxes shall be as manufactured by Price or approved equal.

B. The air pressure drop through the terminal units shall not exceed values tabulated on the plans. Sound levels of the terminal units shall not exceed values shown. All performance data shall be ARI certified and rated in accordance with Standard 880-94. An ARI label is to be attached to all certified units at time of shipping.

C. The valve assembly is to be constructed from galvanized steel with the damper mechanically fastened to a 3/8” shaft and isolated from the casing to eliminate the possibility of damper binding due to shipping or handling damage. The damper shaft is to rotate in oil impregnated sintered bronze bearings at three points for support and long life. The unit casing is to be constructed of 22 gauge galvanized steel.

D. The interior of the box shall have internal foil faced insulation which shall be 1/2” thick, dual density fiberglass with a .001” aluminum foil on the matted face. The insulation shall be UL listed conforming to the UL Test 181 for erosion resistance and shall meet NFPA 90A requirements for 250OF continuous temperature. The edges of the insulation shall be sealed so that there is no exposed fiberglass material in the airstream.

E. A galvanized steel enclosure with a removable cover shall be provided for protection of control components.

F. Terminal units shall have flow taps and calibration chart for the purpose of measuring air flow.

G. Each electric heater will have a integral air flow interlock, automatic reset primary thermal cutout, reset table secondary thermal cutout, and 80/20 Ni-CH element wire. P/E switches shall be included with pneumatic controls. De-energizing magnetic contactors and a 24 volt control transformer shall be included with electric and electronic controls. The electric heater shall be available with 1, 2 or 3 stage heaters for controls as scheduled on the drawings.

21. UVC FIXTURE REQUIREMENTS

A. Lamps and fixtures shall be installed in sufficient quantity and in such a manner so as to provide an equal distribution of UVC energy. When installed, the average intensity striking the intended surface shall not be less than 200

microwatts per square centimeter. The applied energy and its distribution average shall be verified using third party math modeling and that verification shall be included with the submittal.

B. The minimal UVC energy striking a surface shall be sufficient to continuously destroy a mono-layer of mold and bacteria as typically found in HVAC systems in less than six hours. The third party mathematical modeling shall include the destruction time for at least four of the most common HVAC microbes and an energy distribution map.

C. Fixture rows shall be electrically terminated to factory supplied Hard Wire Boxes to meet UL and local electrical codes. Fixtures shall be mounted to irradiate the intended surfaces as well as all of the available line of sight airstream by proper placement and incident angle reflection. Third party irradiation and intensity calculations (modeling) shall determine fixture placement and energy distribution and shall be provided in the submittal.

D. Fixtures shall be track mounted to the appropriate factory supplied hardware to form horizontal rows that provide for the proper fixture support. Fixtures shall be equipped with UL approved fixture-to-fixture mechanical and electrical connections that facilitate proper installation and coupling to A/C power from one end. Fixtures shall be capable of being mounted anywhere in the system and/or as shown on the plans.

E. When used for surface irradiation, the fixture assembly shall be designed and installed such that the sum of the lamp arc lengths in a row shall be equal to a minimum of 90% of the surfaces total width.

F. Fixtures shall meet the “UL” drip proof design and each fixture shall be equipped with an electrical interlock, which will not allow the fixture to energize unless it’s properly installed to its factory supplied mounting track.

G. Fixtures shall be constructed of type 304 stainless steel to preclude corrosion.

H. Power supplies shall be of the high efficiency electronic type, matched to the lamp and designed to maximize UVC photon production, radiance and reliability. They shall be UL Listed and labeled for use in air-streams of 55-135° F. They shall be capable of producing the specified output and organism destruction as specified under Irradiation and Intensity at no more than 13 Watts of power consumption for each square foot of treated, cross sectional plane.

I. Each lamp shall contain no more than 8 milligrams of mercury, consistent with current environmental practices, while producing the specified output at 500 fpm in temperatures of 55-135° F. Useful lamp life shall be 9000 hours with no more than a 20% output loss at the end of one year of continuous use. They shall be constructed with UVC proof metal bases and shall not produce ozone.

J. UVC Fixtures shall be stored in a clean, dry place and protect from weather and construction traffic. UVC Fixtures shall be handled carefully to avoid damage to components, enclosures and finish. Factory-shipping covers shall be left in place until installation is complete. Damaged components shall not be installed, instead replace them and return damaged components to equipment manufacturer.

K. Installation of UVC fixtures

1. Coordinate with installation of HVAC equipment and install Fixtures as indicated above after such equipment is properly installed.
2. Comply with manufacturers' installation instructions regarding wiring and testing and to the drawings and/or specification regarding exact fixture placement for proper energy distribution.
3. Provide an interlock switch on all access panels and doors leading to the UVC assembly and/or within view of the fixtures to assure that the UVC assembly will be de-energized when any of these accesses are opened.
4. When specified and/or called out on the drawings, install a relative indicating radiometer and adjust and set in accordance with manufacturer recommendations.
5. Caution Labels shall be installed on all accesses to the Fixtures.
6. Install fixtures in ALL NEW air handling units.

L. Fixtures shall be as manufactured by Ultra Violet Devices, Inc., ALTRU•V Products or approved equal.

22. ELECTRIC UNIT HEATERS

A. The unit heaters shall be propeller type completely packaged and arranged for ceiling suspension with directional louvers. Capacities shall be as listed in the schedule on the drawings.

B. Elements shall be low temperature, enclosed style made of steel and monel with spiral fins copper-brazed to the element.

C. Controls shall be provided with unit heater and shall consist of unit mounted thermostat, automatic high limit and fan time delay relay. This contractor shall install controls and make operational.

D. Motors shall be permanently lubricated with internal overloads. Each unit shall be U.L. listed.

23. VARIABLE FREQUENCY DRIVES

A. This specification covers a complete Variable Frequency motor Drive (VFD) consisting of a pulse width modulated (PWM) inverter designed for use on a

standard NEMA Design B induction motor. The drive manufacturer shall supply the drive and all necessary controls as herein specified. The manufacturer shall have been engaged in the production of this type of equipment for a minimum of ten years. All VFDs installed on this project shall be from the same manufacturer. VFD shall be as manufactured by ABB, Toshiba, or prior approved equal. VFDs that are manufactured by a third party and "brand labeled" shall not be acceptable.

B. Submittals shall include complete technical product description and include a complete list of options provided. Any portions of the specifications not complied with must be clearly indicated or the supplier and contractor shall be liable to provide all components required to meet the specification.

C. The VFD package as specified herein shall be enclosed in a UL Listed Type enclosure, (NEMA rated enclosures are not acceptable) completely assembled and tested by the manufacturer in an ISO9001 facility. The VFD tolerated voltage window shall allow the VFD to operate from a line of +30% nominal, and -35% nominal voltage as a minimum. Enclosure shall be rated UL type 4 for outdoor use with a self contained air conditioning unit suitable for completely weatherproofed outdoor use and sized to maintain 70 degrees temperature inside the drive at all times. This air conditioning unit shall be factory mounted on the side of the drive and shall not interfere with drive operation.

D. All VFDs shall have the following features:

1. All VFDs shall have the same customer interface, including digital display, and keypad, regardless of horsepower rating. The keypad shall be removable, capable of remote mounting and allow for uploading and downloading of parameter settings as an aid for start-up of multiple VFDs.
2. The keypad shall include Hand-Off-Auto selections and manual speed control. There shall be fault reset and "Help" buttons on the keypad. The Help button shall include "on-line" assistance for programming and troubleshooting.
3. There shall be a built-in time clock in the VFD keypad. The clock shall have a battery back up with 10 years minimum life span. The clock shall be used to date and time stamp faults and record operating parameters at the time of fault. If the battery fails, the VFD shall automatically revert to hours of operation since initial power up. The clock shall also be programmable to control start/stop functions, constant speeds, PID parameter sets and output relays. The VFD shall have a digital input that allows an override to the time clock (when in the off mode) for a programmable time frame. There shall be four (4) separate, independent timer functions that have both weekday and weekend settings. Capacitor backup is not acceptable.
4. The VFD shall be capable of starting into a coasting load (forward or reverse) up to full speed and accelerate or decelerate to setpoint without safety tripping or component damage (flying start).

5. The overload rating of the drive shall be 110% of its normal duty current rating for 1 minute every 10 minutes, 130% overload for 2 seconds. The minimum FLA rating shall meet or exceed the values in the NEC/UL table 430-150 for 4-pole motors.
6. The VFD shall have 5% equivalent impedance internal reactors to reduce the harmonics to the power line and to add protection from AC line transients. The 5% equivalent impedance may be from dual (positive and negative DC bus) reactors, or 5% AC line reactors. VFDs with only one DC reactor shall add an AC line reactor.
7. The VFD shall include a coordinated AC transient protection system consisting of 4-120 joule rated MOV's (phase to phase and phase to ground), a capacitor clamp, and 5% equivalent impedance internal reactors.
8. The VFD shall provide a programmable proof of flow Form-C relay output (broken belt / broken coupling). The drive shall be programmable to signal this condition via a keypad warning, relay output and/or over the serial communications bus. Relay outputs shall include programmable time delays that will allow for drive acceleration from zero speed without signaling a false underload condition.

E. All VFDs to have the following adjustments:

1. Three (3) programmable critical frequency lockout ranges to prevent the VFD from operating the load continuously at an unstable speed.
2. Two (2) PID Setpoint controllers shall be standard in the drive, allowing pressure or flow signals to be connected to the VFD, using the microprocessor in the VFD for the closed loop control. The VFD shall have 250 ma of 24 VDC auxiliary power and be capable of loop powering a transmitter supplied by others. There shall be two parameter sets for the first PID that allow the sets to be switched via a digital input, serial communications or from the keypad for night setback, summer/winter setpoints, etc. There shall be an independent, second PID loop that can utilize the second analog input and modulate one of the analog outputs to maintain setpoint of an independent process (ie. valves, dampers, etc.). All setpoints, process variables, etc. to be accessible from the serial communication network.
3. Two (2) programmable analog inputs shall accept current or voltage signals.
4. Two (2) programmable analog outputs (0-20ma or 4-20 ma). The outputs may be programmed to output proportional to Frequency, Motor Speed, Output Voltage, Output Current, Motor Torque, Motor Power (kW), DC Bus voltage, Active Reference, and other data.
5. Six (6) programmable digital inputs.
6. Three (3) programmable digital Form-C relay outputs. The relays shall include programmable on and off delay times and adjustable hysteresis. The relays shall be rated for maximum switching current 8 amps at 24 VDC and 0.4 A at 250 VAC; Maximum voltage 300 VDC and 250 VAC; continuous

current rating 2 amps RMS. Outputs shall be true Form-C type contacts; open collector outputs are not acceptable.

7. Run permissive circuit - There shall be a run permissive circuit for damper or valve control. Regardless of the source of a run command (keypad, time-clock control, or serial communications) the VFD shall provide a dry contact closure that will signal the damper to open (VFD motor does not operate). When the damper is fully open, a normally open dry contact (end-switch) shall close. The closed end-switch is wired to a VFD digital input and allows motor operation. Two separate safety interlock inputs shall be provided. When either safety is opened, the motor shall be commanded to coast to stop, and the damper shall be commanded to close.
8. Two independently adjustable accel and decel ramps with 1 – 1800 seconds adjustable time ramps.
9. The VFD shall include a motor flux optimization circuit that will automatically reduce applied motor voltage to the motor to optimize energy consumption and audible motor noise.
10. The VFD shall include a carrier frequency control circuit that reduces the carrier frequency based on actual VFD temperature that allows higher carrier frequency without derating the VFD or operating at high carrier frequency only at low speeds.
11. The VFD shall include password protection against parameter changes.

F. The Keypad shall include a backlit LCD display. The display shall be in complete English words for programming and fault diagnostics (LED and alpha-numeric codes are not acceptable). All VFD faults shall be displayed in English words.

G. All applicable operating values shall be capable of being displayed in engineering (user) units. A minimum of three operating values from the list below shall be capable of being displayed at all times. The display shall be in complete English words (alpha-numeric codes are not acceptable):

Output Frequency
Motor Speed (RPM, %, or Engineering units)
Motor Current
Drive Temperature
DC Bus Voltage
Output Voltage

H. The VFD shall include a fireman's override input. Upon receipt of a contact closure from the fireman's control station, the VFD shall operate in one of two modes: 1) Operate at a programmed predetermined fixed speed or operate in a specific fireman's override PID algorithm that automatically adjusts motor speed based on override set point and feedback . The mode shall override all other inputs (analog/digital, serial communication, and all keypad commands), except customer defined safety run interlock, and force the motor to run in one of the two modes above. "Override Mode" shall be displayed on the keypad. Upon removal of the override signal, the VFD shall resume normal operation.

I. Serial Communications
   1. The VFD shall have an RS-485 port as standard. The standard protocols shall be Modbus, BACnet, Johnson Controls N2 bus, and Siemens Building Technologies FLN. Each individual drive shall have the protocol in the base VFD. The use of third party gateways and multiplexers is not acceptable. All protocols shall be "certified" by the governing authority (i.e. BTL Listing for BACnet). Use of non-certified protocols is not allowed.
   2. The BACnet connection shall be an RS485, MS/TP interface operating at 9.6, 19.2, 38.4, or 76.8 Kbps. The connection shall be tested by the BACnet Testing Labs (BTL) and be BTL Listed. The BACnet interface shall conform to the BACnet standard device type of an Applications Specific Controller (B-ASC). The interface shall support all BIBBs defined by the BACnet standard profile for a B-ASC including, but not limited to:
      a. Data Sharing – Read Property – B.
      b. Data Sharing – Write Property – B.
      c. Device Management – Dynamic Device Binding (Who-Is; I-AM).
      d. Device Management – Dynamic Object Binding (Who-Has; I-Have).
      e. Device Management – Communication Control – B.

   3. Serial communication capabilities shall include, but not be limited to; run-stop control, speed set adjustment, proportional/integral/derivative PID control adjustments, current limit, accel/decel time adjustments, and lock and unlock the keypad. The drive shall have the capability of allowing the DDC to monitor feedback such as process variable feedback, output speed / frequency, current (in amps), % torque, power (kW), kilowatt hours (resettable), operating hours (resettable), and drive temperature. The DDC shall also be capable of monitoring the VFD relay output status, digital input status, and all analog input and analog output values. All diagnostic warning and fault information shall be transmitted over the serial communications bus. Remote VFD fault reset shall be possible.

J. EMI / RFI filters. All VFDs shall include EMI/RFI filters. The VFD shall comply with standard EN 61800-3 for the First Environment, restricted level with up to 100' of motor cables. No Exceptions. Certified test lab test reports shall be provided with the submittals.

K. All VFDs through 60HP shall be protected from input and output power mis-wiring. The VFD shall sense this condition and display an alarm on the keypad. The VFD shall not be damaged by this condition.

L. The following additional features shall be furnished and mounted by the drive manufacturer. All additional features shall be UL Listed by the drive manufacturer as a complete assembly and carry a UL508 label.
   1. A complete factory wired and tested bypass system consisting of an output contactor and bypass contactor, service (isolation) switch and VFD input

fuses are required. Bypass designs, which have no VFD only fuses, or that incorporate fuses common to both the VFD and the bypass will not be accepted

2. Door interlocked padlockable circuit breaker that will disconnect all input power from the drive and all internally mounted options.
3. The drive / bypass shall provide single-phase motor protection in both the VFD and bypass modes.
4. The bypass enclosure door and VFD enclosure shall be interlocked such that input power is turned off before either enclosure can be opened.
5. The VFD and Bypass as a package shall have a UL listed short circuit rating of 100,000 amps and shall be indicated on the data label.

M. The following operators shall be provided:
   1. Bypass Hand-Off-Auto
   2. Drive mode selector and light
   3. Bypass mode selector and light
   4. Bypass fault reset
   5. Bypass LDC display, 2 lines, for programming and status / fault / warning indications
   6. Motor protection from single phase power conditions - The Bypass system shall be able to detect a single phase input power condition while running in bypass, disengage the motor in a controlled fashion, and give a single phase input power indication. Bypass systems not incorporating single phase protection in Bypass mode are not acceptable.
   7. The system (VFD and Bypass) tolerated voltage window shall allow the system to operate from a line of +30%, -35% nominal voltage as a minimum. The system shall incorporate circuitry that will allow the drive or bypass contactor to remain “sealed in” over this voltage tolerance at a minimum.
   8. The Bypass system shall NOT depend on the VFD for bypass operation. The bypass shall be completely functional in both Hand and Automatic modes even if the VFD has been removed from the enclosure for repair / replacement.
   9. Serial communications – the VFD shall be capable of being monitored and or controlled via serial communications. Provide communications protocols for ModBus; Johnson Controls N2; Siemens Building Technologies FLN (P1) and BACnet.
   10. Run permissive circuit - there shall be a run permissive circuit for damper or valve control. Regardless of the source of a run command (keypad, time-clock control, or serial communications) the VFD and bypass shall provide a dry contact closure that will signal the damper to open (VFD motor does not operate). When the damper is fully open, a normally open dry contact (end-switch) shall close. The closed end-switch is wired to a VFD system input and allows motor operation. Two separate safety interlock inputs shall be provided. When either safety is opened, the motor shall be commanded to coast to stop, and the damper shall be commanded to close.

11. The bypass control shall monitor the status of the VFD and bypass contactors and indicate when there is a welded contactor contact or open contactor coil. This failed contactor operation shall be indicated on the Bypass LCD display as well as over the serial communications protocol.
12. The bypass control shall include a programmable time delay for bypass start and keypad indication that this time delay is in process. This will allow VAV boxes to be driven open before the motor operates at full speed in the bypass mode. The time delay shall be field programmable from 0 – 120 seconds.
13. The bypass control shall be programmable for manual or automatic transfer to bypass. The user shall be able to select via keypad programming which drive faults will generate an automatic transfer to bypass and which faults require a manual transfer to bypass.
14. There shall be an adjustable motor current sensing circuit for the bypass and VFD mode to provide proof of flow indication. The condition shall be indicated on the keypad display, transmitted over the building automation protocol and on a relay output contact closure.
15. The bypass controller shall have six programmable digital inputs, and five programmable Form-C relay outputs.
16. The relay outputs from the bypass shall programmable for any of the following indications.
    a. System started
    b. System running
    c. Bypass override enabled
    d. Drive fault
    e. Bypass fault
    f. Bypass H-O-A position
    g. Motor proof of flow (broken belt)
    h. Overload
    i. Bypass selected
    j. Bypass run
    k. System started (damper opening)
    l. Bypass alarm
    m. Over temperature

17. The digital inputs for the system shall accept 24VAC or 24VDC. The bypass shall incorporate internally sourced power supply and not require an external control power source. The bypass power board shall supply 250 ma of 24 VDC for use by others to power external devices.
18. Customer Interlock Terminal Strip – provide a separate terminal strip for connection of freeze, fire, smoke contacts, and external start command. All external safety interlocks shall remain fully functional whether the system is in VFD or Bypass mode. The remote start/stop contact shall operate in VFD and bypass modes. The terminal strip shall allow for independent connection of up to four (4) unique safety inputs.
19. The user shall be able to select the text to be displayed on the keypad when the safety opens. Example text display indications include “Firestat”,

"Freezestat", "Over pressure" and "Low pressure". The user shall also be able to determine which of the four (4) safety contacts is open over the serial communications connection.

20. Class 10, 20, or 30 (selectable) electronic motor overload protection shall be included.

N. Certified factory start-up shall be provided for each drive by a factory certified service center. A certified start-up form shall be filled out for each drive with a copy provided to the owner, and a copy kept on file at the manufacturer.

O. Contractor Warranty shall be 12 months from the date of certified start-up, and acceptance by Owner. The warranty shall include all parts, labor, travel time and expenses.

PART 3 - EXECUTION

24. INSTALLATION

A. All equipment and controls shall be installed in accordance with manufacturer's recommendations. Installation, adjustments and starting shall be done under supervision of manufacturer's representative.

B. All ductwork and equipment shall be installed in a neat and workmanlike manner in accordance with the guidelines of NFPA 90-A and the best practice of the trade.

C. Provide manual firestats, set at 125 degrees F, in return inlets of all fans and blowers and all exhaust fans of 600 cfm and over.

D. This Contractor shall furnish and install any and all mechanical items which are required to complete the temperature controls which are to be provided under this section of the specifications.

E. All piping as specified under this section shall be tested to the following pressures:

Chilled water	-	100 psi
Condensate drain	-	10 psi

F. The method of application of tests and duration shall be as described in SECTION 15050. Maximum of 5% pressure loss during the duration will be acceptable.

G. Upon completion of the installation of all work and equipment the Contractor shall start all equipment and make all necessary tests and adjustments to place entire

heating, ventilating and air conditioning systems in a satisfactory condition for continuous safe operation of facilities.

H. All filters shall be replaced with MERV 11 type after period of test and adjustment.

25. OPERATION OF AIR-HANDLING UNITS DURING CONSTRUCTION

Contractor shall provide 2”-85% efficient filters for units with 1.0” ESP and greater or (sets of 2) MERV 12, 1” filters for units under 1.0” ESP for air-units operated during construction. In addition roll type filter media shall be provided on all return air grilles and unit openings. Contractor shall be responsible for changing media as required. The Contractor is to protect the air unit coils and keep air-unit and duct interior surfaces clean. If the Contractor fails to comply with the filtration requirements, the Contractor shall clean and/or replace the coils and duct system at his expense.

END OF SECTION

SECTION 15850 - TESTING AND BALANCING OF AIR AND HYDRONIC SYSTEMS

PART 1 - GENERAL

1. DESCRIPTION

A. The Contractor shall furnish all labor, equipment and services necessary for and incidental to Air and Water Systems Testing and Balancing.

B. The Contractor shall procure the services of an independent testing and balancing agency. The Testing and Balancing Agency (TBA) specializes in testing and balancing of heating, ventilating, air-moving equipment, air-conditioning system and Hydronic systems. The Mechanical Contractor shall award the test and balance contract to the above agency as soon as possible after receipt of contract.

C. Testing and Balancing shall not begin until the systems have been completed and are in full working order.

D. Shop drawings must be provided to the TAB firm no later than 30 days after the final, approved shop drawings have been returned by the Architect to the Contractor.

E. Duct leakage testing shall be the responsibility of the TBA subcontractor.

F. Fire and smoke damper testing shall be done by the contractor and witnessed by the TAB firm.

G. The final and complete Test and Balance Report shall be submitted, for approval, not less than two weeks before a final inspection of the Project is requested by the General Contractor. Failure to provide the Report shall be cause to delay the final inspection until the Report is approved.

H. Contractor is cautioned that test and Balance Report shall include Grille counts, and Supply, Return, Outside Air and Exhaust Duct Traverses so that duct leakage can be calculated.

2. REFERENCES

A. AABC – National Standards for Total System Balance.

B. NEBB – Procedural Standards for Testing, Adjusting, and Balancing.

3. SUBMITTALS

A. Field Reports: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.

B. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect/Engineer and for inclusion in operating and maintenance manuals.

C. Provide reports in soft cover, letter size, binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating, thermostat locations.

4. QUALITY ASSURANCE

Perform total system balance in accordance with AABC National Standards for Field Measurement and Instrumentation, Total System Balance or NEBB Standards – Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems or Testing Adjusting and Balancing Bureau (TABB)-National Standards for Environmental Systems Balance.

5. QUALIFICATIONS

TBA shall be a Company specializing in the testing, adjusting, and balancing of systems specified in this Section with minimum three years experience.

PART 2 - PRODUCTS

6. ADJUSTMENT DEVICES

Replacement of adjustable pulleys, additional balancing dampers, additional fan belts, pressure taps and fitting, hydronic balancing valves and any other devices or equipment required to effect proper testing, adjusting and balancing shall be provided shall be provided by the Contractor at no additional cost to the Owner.

PART 3 - EXECUTION

7. EXAMINATION

A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:

1. Systems are started and operating in a safe and normal condition.
2. Temperature control systems are installed complete and operable.
3. Proper thermal overload protection is in place for electrical equipment.
4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
5. Duct systems are clean of debris.
6. Fans are rotating correctly.
7. Fire and volume dampers are in place and open.
8. Air coil fins are cleaned and combed.
9. Access doors are closed and duct end caps are in place.
10. Air outlets are installed and connected.
11. Duct system leakage is minimized.
12. Hydronic systems are flushed, filled, and vented.
13. Pumps are rotating correctly.
14. Proper strainer baskets are clean and in place.
15. Service and balance valves are open.

B. Beginning of work means acceptance of existing HVAC conditions.

8. INSTALLATION TOLERANCES

A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 5 percent of design for return and exhaust systems.

B. Air Outlets and Inlets; Adjust total to within plus 5 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 5 percent of design.

C. Hydronic Systems: Adjust to within plus or minus 5 percent of design.

9. ADJUSTING – GENERAL

A. Ensure recorded data represents actual measured or observed conditions.

B. Permanently mark setting of valves, dampers, and other adjustment devices allowing setting to be restored. Set and lock memory stops.

C. After adjustment, take measurement to verify balance has not been disrupted or that such disruption has been rectified.
D. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

E. At the time of final inspection the TAB agency may be required to recheck, in the presence of the Owner's Representative, specific and random selections of data, air quantities, and air motion recorded in the certified report. Points and areas for recheck shall be selected by the Architect. Measurements and test procedures shall be the same as approved for the initial work for the certified report. Selections for recheck, specific plus random, shall not exceed 10% of the total number tabulated in the report.

10. AIR SYSTEMS PROCEDURE (MINIMUM REQUIREMENTS)

A. Test and adjust fan RPM to design requirements.

B. Test and record motor full load nameplate rating and actual ampere draw.

C. Test and record system static pressures, fan suction and discharge.

D. Adjust all main supply and return air duct to proper design CFM.

E. Test and adjust each diffuser, grille and register (new and existing as indicated on drawings). Reading and tests of diffusers, grilles and registers shall include design velocity (FPM) and as adjusted velocity, design CFM and adjusted CFM.

F. Test and record outside, mixed air and discharge temperatures (D.B. for heating cycle, D.B. and W.B. for cooling cycle).
G. In coordination with the ATC contractor, set adjustments of automatically operated dampers to operate as specified, indicated and/or noted.

H. Test and adjust air handling and distribution systems to provide required or design supply, return, outside and exhaust air quantities.

I. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.

J. Measure air quantities at air inlets and outlets.

K. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.

L. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.

M. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.

N. Provide system schematic with required and actual air quantities recorded at each outlet or inlet

O. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.

P. Adjust outside air automatic dampers, outside air, return air and exhaust dampers for design conditions.

Q. Measure temperature conditions across air, return air, and exhaust dampers to check leakage.

R. Where modulating dampers are provided, take measurement and balance at extreme conditions.

S. Measure and record pressure differentials between designated spaces.

11. WATER SYSTEM PROCEDURE (MINIMUM REQUIREMENTS)

A. Prepare itemized equipment schedules, listing all heating and/or cooling elements and equipment in the systems to be balanced. List in order on equipment schedules, by pump or zone according to the design, all heating or cooling elements all zone balancing valves circuit pump and ending with the last items of equipment or transfer element in the respective zone or circuit. Include on schedule sheet column titles listing the location, type of element or apparatus, design conditions and measured conditions. Prepare individual pump report sheets for each zone or circuit.

B. Adjust water systems (new and existing as indicated on drawings) to provide required or design quantities.

C. Use calibrated Venturi tubes, orifices, or other metered fitting and pressure gages to determine flow rates for system balance. Where flow-metering devices

are not installed, base flow balance on temperature difference across various heat transfer elements in the system.

D. Adjust systems to provide specified pressure drops and flows through heat transfer elements prior to thermal testing. Perform balancing by measurement of temperature differential in conjunction with air balancing.

E. Effect system balance with automatic control valves fully open to heat transfer elements.

F. Effect adjustment of water distribution systems by means of balancing cocks, valves, and fittings. Do not use service or shut-off valves for balancing unless indexed for balance point.

G. Test pumps and adjust flow. Record the following on pumps report sheets: (a) suction and discharge pressure, (b) running amps and brake horsepower of pump motor under full flow and no flow conditions, (c) pressure drop across pump in feet of water and total GMP pump is handling under full flow conditions.

H. Where available pump capacity is less than total flow requirements or individual system parts, full flow in one part may be simulated by temporary restriction of flow to other parts.

12. REQUIRED REPORTS TO BE SUBMITTED

The following reports shall be submitted, as a minimum, with a complete Title Page, Summary , and Instrument List. All data and nomenclature shall be provided, as required by AABC and/or NEBB Procedure manuals, for each device tested and balanced.

1. Electric Motors.
2. V-Belt Motors.
3. VFD Drives.
4. Pump Data.
5. Heating and Cooling Coils Data.
6. Air Moving Equipment.
7. Return Air/ Outside Air Data.
8. Exhaust Air Data.
9. Duct Traverses.
10. Air Distribution Test Sheets.

13. COMMISSIONING

A. Balancing Agency shall coordinate with the Mechanical Contractor the Commissioning requirements as here-in-before specified.

B. Contractor is cautioned that the Owner, thru the Architect, reserves the right to check and verify any and all points and readings of the Test and Balance report. If 15% or more of the points do not agree with the report, then the Contractor shall re-test and re-balance the entire project and submit a complete new Report. If 15% or more of this new Data is independently verified and still does not agree with the Contractor's new Report, then the Owner has the right to hire an Independent Test and Balance Contractor and the Original Contractor shall be held responsible to pay these costs.

C. All TAB deficiencies shall be corrected when found. Any deficiencies that are (for whatever reason) not corrected immediately shall be shown in the TAB report and listed on a summary sheet in the front of the TAB report. The TAB report must be completed and accepted by the Architect before the project is accepted and all items on the summary sheet shall become punch list items with dollar values assigned to them.

END OF SECTION

SECTION 15900 - VALVES, STRAINERS, UNIONS, AND FITTINGS

PART 1 – GENERAL

1 SUMMARY

The work under this heading includes the furnishing and installing of all required appurtenances incidental to the piping systems as indicated on the drawings. Refer to SECTION 15050 which shall apply to all work in this Section.

PART 2 - PRODUCTS

2 GENERAL

A. Provide factory-fabricated valves for use in service indicted. Provide valves of types and pressure ratings indicated; provide proper selection to comply with installation requirements. Provide sizes as indicated, and connections, which properly mate with pipe, tube, and equipment connections. Where more than one type is indicated, selection is installer's option. Valves shall be of same make for all these services.

B. Valves shall comply with the following:

Gate - cast iron - MSS SP-70
Gate - bronze - MSS SP-80
Globe - cast iron -MSS SP-85
Globe - bronze - MSS SP-80
Ball - MSS SP-110
Check - cast iron - MSS SP-71
Check - bronze - MSS SP-80

C. Gate valves shall be equipped with packing suitable for intended service. (Under no circumstances is asbestos acceptable.) Valves shall be designed so back seating protects packing and stem threads from media when valve is fully opened, and equipped with gland follower. Guides for disc on rising stem valves shall be machined for accurate fit.

D. Globe valves shall be equipped with packing suitable for intended service. (Under no circumstances is asbestos acceptable.) Globe valves shall be designed so back seating protects packing and stem threads from media when valve is fully opened, and equipped with gland follower.

E. Ball valves shall have FULL port opening blow out proof stem: hard chrome plated forged brass ball, rated not less than 600# W.O.G.

F. Provide gear operators on butterfly valves 8" and larger. Valve bodies shall have extended necks to provide for 2-1/4" insulation.

G. Provide valves with features indicated and where not otherwise indicated, provide proper valve features as outlined in this specification. Comply with ANSI B31.1.

H. Valve flanges shall comply to ANSI B16.1 (cast iron), ANSI B16.5(steel), ANSI B16.24 (bronze).

I. Threaded valve ends shall comply with ANSI B2.1.

J. Butt-Weld valve ends shall comply with ANSI B16.25.

K. Solder Joint valve ends shall comply with ANSI B16.18.

L. Flangeless valve bodies shall be manufactured to fit between flanges and shall comply with ANSI B16.1 (cast iron), ANSI B16.5 (steel), or ANSI B16.24 (bronze).

M. Fabricate pressure-containing components of valves, including stems and seats from brass or bronze materials, of standard alloy recognized in valve manufacturing that resist de-zincification.

N. Design seat of valve with removable disc, and assemble valve so disc can be replaced when worn.

O. Butterfly valves shall be designed for flow regulation, and manufactured to be tight in closed position. Test pressures in accordance with MSS SP-67 as follows: Seat 2-12" 220psi. No leakage shall be permitted under test.

3. GLOBE VALVES FOR STEEL PIPING

A. Threaded Ends 2" and Smaller: Class 125, bronze body, union bonnet, rising stem, Teflon disc: Nibco T-211-Y.

B. Flanged Ends 2-1/2" and Larger: Class 125, iron body, bolted bonnet, rising stem, OS&Y, renewable seat and disc: Nibco F718-B.

4. GATE VALVES FOR STEEL PIPING

A. Threaded Ends 2” and Smaller: Class 125, bronze body, union bonnet, rising stem, solid wedge: Nibco T-124.

B. Flanged Ends 2-1/2” and Larger: Class 125, iron body, bronze mounted, bolted bonnet, rising stem, OS&Y, solid wedge: Nibco F617-0.

5. GLOBE VALVES FOR COPPER PIPING

A. Soldered Ends 2” and Smaller: Class 125, bronze body, screwed bonnet, rising stem, bronze disc (swivel type): Nibco S211-B.

B. Flanged Ends 2-1/2” and Larger: Class 125, iron body, bolted bonnet, rising stem, OS&Y, renewable seat and disc: Nibco F718-B. Provide dielectric gasket and bolt isolators.

6. GATE VALVE FOR COPPER PIPING

A. Flanged Ends 2-1/2" and Larger: Class 125, iron body, bronze mounted, bolted bonnet, rising stem, OS&Y, solid wedge: Nibco F617-0.
Provide dielectric gasket and bolt isolators.

B. Solder Ends 2" and Smaller: Class 125, bronze body, screwed bonnet, rising stem, solid wedge: Nibco S-111. (Non-rising stem gate valves may be used where headroom prevents full extension of rising stems: Nibco S-113.)

7. BALL VALVES

A. Threaded Ends 4" and Smaller: 600# W.O.G., forged brass two piece body, hard chrome plated forged brass ball, blow-out proof stem: Nibco T-FP-600.

B. Soldered Ends 2" and Smaller: 600# W.O.G., forged brass two piece body, hard chrome plated forged brass ball, true adjustable packing nut ("O"-ring only type stem seal not acceptable), blow-out proof stem: Nibco S-585-70.

8. SWING CHECK VALVE IN COPPER PIPING

A. Soldered Ends 2" and Smaller: Class 125, bronze body, screwed cap, "Y" pattern swing, bronze disc: Nibco S-413B.

B. Flanged Ends 2-1/2" and Larger: Class 125, iron body, bronze mounted, horizontal swing, cast-iron disc: Nibco F918-B. Provide dielectric gasket with insulated bolts.

9. SWING CHECK VALVES IN STEEL PIPING

A. Threaded Ends 2" and Smaller: Class 125, bronze body, screwed cap, "Y" pattern swing, Teflon disc: Nibco T-413Y.

B. Flanged Ends 2-1/2" and Larger: Class 125, iron, bronze mounted, horizontal swing, cast-iron disc: Nibco F918-B.

10. UNIONS IN COPPER LINES

    Cast Bronze Unions.

11. UNIONS IN BLACK STEEL, WROUGHT IRON OR GALVANIZED STEEL PIPING

    Ground joint malleable iron galvanized for 2" nominal pipe sizes or below. For pipe sizes 2-1/2" and larger use forged steel welding flanges (Galvanized for galvanized piping).

12. UNIONS IN CONNECTION BETWEEN COPPER AND STEEL OR IRON PIPING

    Provide bronze valves or Victaulic dielectric waterways.

13. BALANCING COCKS

    Nibco T/S1710.

14. STRAINERS

    Through 2-1/2" Metraflex Style S - Screwed; Zurn Model YSBR 20 mesh monel screen through 2"; .045 stainless steel on 2-1/2"; Strainers on 3" and above Metraflex Style M1 - flanged; Zurn Model FS 3" to have .045 mesh, ss screws; 3-1/2" and above .125 mesh, ss screws.

15. GAGE COCK

    Crane No. 744, or Weiss TC-14, all bronze.

16. GAUGES

    Furnish and install where shown on the plans or where good practice required, pressure gauges with 4-1/2 glass dial face, corrosion resistant stainless steel case and ring, balanced adjustable black pointer guaranteed accurate to 1% of range, easy read dial - white background with bold black numerals and graduations, 270 degree ARG, 1/4" N.P.T. bottom connection.

17. THERMOMETERS

    Shall be Adjustable Angle type with 9" case, lens front reading mercury tube, with angle satin finish aluminum scales, bold black numerals, bold scale graduations, thick glass windows, and die cast aluminum case with baked bronze finish. Thermometer shall rotate 180 degrees and stem swivels 180 degrees in 10 degree

increments separable wells to suit insulation. For chilled water 20 degrees to 120 degrees. For hot water 30 degrees to 240 degrees.

18. LUBRICATED PARALLEL PLUG VALVES

A. Lubricated parallel plug valves shall be installed at all locations shown on the drawings for gas valves and shall be the same sizes as the service pipe. Valves shall have a pressure rating of 125 PSI at 450 degrees F and 200 PSI from –20 degrees F to 150 degrees F.

B. Valves shall be of the lubricated parallel (cylindrical) plug type with clearance between plug and body sealing surfaces equal to, or less than .002 inch. The body, plug and bottom cover shall be cast iron (ASTM A126 C1B).

C. Valves shall be flanged with face to face dimensions in accordance with ANSI B16.10 short pattern.

D. The plug shall have a rectangular port, reduced bore, having a flow area equal to, or greater than, 60% of the same size of the pipe. The body/plug juncture shall have a reinforced TFE thrust washer to minimize operating torque. The valve body shall have a surface penetrating hot phosphate protective treatment.

E. The valve lubricating systems shall have a lubricating screw with buttonhead fitting, and a tight sealing lubricated check valve in the valve stem, and shall be so constructed as to ensure complete lubrication of all sealing surfaces. Lubricant extruding around the valve stem shall indicate that the system is filled to capacity. The sealing compound shall have a temperature ranging from –20 degrees F to 400 degrees F.

F. Valves shall be Milliken Model 171M or Homestead Model 612, or approved equal

PART 3 - EXECUTION

19. WORKMANSHIP AND INCIDENTAL ITEMS

A. All valves shall be installed so as to be easily accessible for cleaning, inspection, maintenance, and operation.

B. Install valves with stems pointed up, in vertical position where possible, but in no case with stems pointed downward for horizontal plane unless unavoidable. Provide chain operators on all valves over 6’ above floor in mechanical rooms.

C. Except as otherwise indicated, install valves with the following ends or types of pipe/tube connections:

Tube Size 2" and smaller - Soldered-joint valves
Pipe Size 2" and smaller - Threaded valves
Pipe Size 2-1/2" and larger - Butt-weld end valves or
Flanged end valves

D. Install swing check valves in horizontal position, unless otherwise shown on drawings, with hinge pin horizontally perpendicular to centerline of pipe. Install for proper direction of flow.

E. Provide access panels at all concealed valves.

F. Major control and sectionalizing valves throughout building shall be identified by means of a brass valve tag bracketed to valve handle. Contractor shall prepare schedule of such identifying plates and frame under glass for installation in main equipment room.

G. All welded piping to be welded by certified welders skilled in the work to be done.

H. No piping of dissimilar metals placed in contact or in close proximity with each other. Provide bronze valves wherever piping of dissimilar metals is joined.

I. Run all piping concealed unless specifically noted otherwise, making all necessary offsets, turns, etc., necessary to conceal piping from view.

J. Provide all necessary steel frame supports, anchor bolts, sleeves, etc., required for safe support of equipment and piping installed under this contract. The Mechanical Contractor shall be completely responsible for the accurate position and dimensions of all foundations and support items.

END OF SECTION

SECTION 15950 – BUILDING AUTOMATION SYSTEM

PART 1 - GENERAL

1. RELATED DOCUMENTS: Refer to Section 15010 - BASIC MECHANICAL

2. SCOPE

   A. Furnish and install a complete system of electric, electronic, and direct digital temperature controls as necessary to accomplish the sequences as specified.

      Building Automation System Intention: At the conclusion of this project, the following functionality shall exist. The Port of New Orleans Operators shall have full command and control capability of all DDC points for both the Erato Street and Julia Street Terminal building Operator Stations (one integrated dashboard for both buildings) from both Operator Terminals located in each building. In other words, all DDC points from the Julia Street Operator Station must be completely accessed and managed by the existing Erato Street Operator Terminal. All graphics, trending, scheduling, historical data storage and overall DDC management of the Julia Street DDC system must be accessed by the Erato Street Terminal and vice versa, via the existing Port of New Orleans IT Infrastructure. This means that the new DDC controllers must be seamlessly interfaced to the existing Honeywell Enterprise Buildings Integrator Building Automation System. The cost for all work associated with the seamless interface must be included by the contractor of this section. Systems that create an additional hyperlink and/or a separate “Window” on the same Operator Terminal are not accepted. A new Operator Terminal must be provided for the Julia Street Terminal an must be fully integrated with the existing Erato Street Terminal Building Automation, so that the Operator’s have “Integrated” control of both buildings from the Julia Street Operator Terminal.

   B. Furnish and install a complete system of electric, electronic, and direct digital temperature controls as necessary to accomplish the sequences as specified. The control system shall be as manufactured by Honeywell Building Solutions model Enterprise Buildings Integrator. The Port of New Orleans has directed that there will be no alternate system manufacturer allowed.

   C. The temperature controls shall include electrical interlocking of motor starters and other equipment, which is supplied as part of the heating, ventilation, and air conditioning system. Individual components of the system shall be DDC/electric.

   D. The control system shall consist of all thermostats, temperature transmitters, controllers, automatic valves and dampers, damper operators, control panels,

relays, accessory control equipment, and a complete system of electric wiring to fill the intent of the specification and provide for a complete operable system.

E. Workmen regularly employed by the approved control manufacturers listed herein shall install the control system. No other workmen to install the control system will be approved. The system shall be guaranteed free of defects in workmanship and material for a period of one (1) year. The local manufacturer's branch office of the control supplier shall furnish complete control drawings, showing the operation of the air conditioning and mechanical control system.

F. Submit eight (8) copies of manufacturers' drawings to the Architect for all equipment and controls. Drawings shall include detailed dimensions, capacities.

PART 2 - PRODUCTS

3. ELECTRICAL

A. The Electrical Division (16000) shall provide all power wiring to the Starters/VFD's and from the Starters/VFD's to the motors. The electrical contractor shall perform all connections into the power circuit.

B. The electrical work included in this section includes furnishing, installing, and wiring the temperature control devices as necessary to comply with the sequence of operation. All wiring shall be new and done in accordance with all governing codes. The maximum allowable control and interlocking voltage shall be 120 volts. All 120 volt wiring shall be installed in electrical raceways in accordance with requirements of Division 16000. All wiring in Mechanical Equipment Rooms shall be installed in electrical raceways. All exposed conduits shall be run parallel to the lines of the building.

4. AUTOMATIC CONTROL DAMPERS

Automatic control dampers shall be opposed blade type with sizes as indicated on the plans. All damper blades shall not be less than 16 gauge galvanized steel roll formed for high velocity performance. Blades on all dampers must not be over 8" wide. All blade linkage hardware shall be of corrosive resistant finish and readily accessible for maintenance after installation. Dampers shall have minimum leakage rate of 1% for all applications.

5. DUCT SMOKE DETECTORS

Duct smoke detectors are furnished and installed by the Fire Alarm Contractor. This contractor shall provide the wiring between the fire alarm control module and

the unit fan starter. The control module shall be mounted by the Fire Alarm Contractor next to the unit fan Starter/VFD.

6. DIFFERENTIAL PRESSURE SWITCHES

A. Unit for fluid flow proof shall be JCI P74, United Electric J Series, Honeywell AP 5 or equal.

Range	8 to 70 psi
Differential	3 psi
Maximum differential pressure	200 psi
Maximum Pressure	325 psi

B. Unit for airflow proof shall be P32, Robertshaw PC-301, or equal.

Set point ranges	.05” WG to 1.0” WG
	1.0” WG to 12.0” WG

7. CONTROL VALVES

A. All modulating straight-through water valves shall be provided with equal percentage contoured throttling plugs. All three-way valves shall be provided with linear throttling plugs such that the total flow through the valve shall remain constant regardless of valve’s position.

B. Valves 3” and smaller shall be screwed type; valves 4” and larger shall be flanged type. Valves shall be factory-rated to withstand the pressures encountered. Valves shall have stainless steel stems and spring-loaded teflon packing.

C. Water valves shall be sized for a pressure drop equal to the coil they serve, but not to exceed 10 feet. Valves shall have replacement seats and discs.

D. Where two or more actuators are to be operated simultaneously or sequentially with each other, provide sequencing devices for accuracy and non-overlapping operation.

E. Control valve pressure drop shall be no greater than 10 feet in the full open position. Provide adjustable valve stem stops to insure this actual pressure drop when the valve actuator is fully extended.

8. VALVE AND DAMPER ACTUATORS

A. Units shall be quiet in operation and shall be sized to operate the control devices to which they are connected.

B. In two position applications, in the event of a power failure, operator shall be provided with spring return so it will “fail safe” in either the normally open or closed position as required per the application.

C. In modulating applications, the actuator shall accept a 4-20ma, 0-10Vdc, or floating input as required per the application. Actuators shall be powered from a 120vac or 24vac power source provided by this contractor.

9. SPACE TEMPERATURE

A. Sensors shall be RTD, balco or solid state devices with a temperature range 20 to 120 degrees F. The sensor shall be complete with a decorative cover and suitable for mounting over a standard electrical utility box.

B. The ILC (Interoperable Lonmark Controller) Sensor, if available, shall connect directly to the ILC and shall not utilize any of the I/O points of the controller. The ILC Sensor shall provide a two-wire connection to the controller that is polarity and wire type insensitive. The ILC Sensor shall provide a communications jack for connection to the LON communication trunk to which the ILC controller is connected. The ILC Sensor, the Connected controller, and all other devices on the LON bus shall be accessible by the Graphical Programming tool. The ILC Sensor shall be supplied in the following variations;

Tamper-resistant (no display)

Tamper-resistant with tenant override

Basic user functions (LCD display and setpoint adjustment and tenant override)

Full user functions (LCD display and network-variable access and tenant override)

ASHRAE 95 compliance (LCD display and sub-base functionality)

C. The ILC Sensor shall be provided in a modular configuration that allows for the rough in of all wiring without the presence of the electronics or esthetic covering. The ILC Sensor shall allow for the customization of the color on the esthetic covering as a standard offering. User interface with the ILC Sensor shall be provided as a configurable function by the FMCS, and shall offer password protection for access to network variable editing. Multiple network variables shall be accessible and editable by the ILC Sensor. Icons shall be utilized to represent sensor and controller function status, affording independence from a single language for use interface

D. Honeywell TR21 and TR23 model space temperature sensors are approved.

10. DUCT TEMPERATURE

Sensors shall be RTD, balco or solid state devices with a insertion measuring probe and a temperature range of 20 to 120 degrees F. For all mixed air and preheat air applications, install bendable averaging duct sensors with a minimum 12 feet long sensor element.

11. OUTSIDE AIR TEMPERATURE

Sensor shall be RTD, balco or solid state device mounted in the outdoors where airflow occurs. The temperature range shall be -20 to 180 degrees F. Provide a sun shield and weatherproof assembly for mounting to ½ inch rigid conduit.

12. SPACE HUMIDITY

Intercap sensing element shall have an accuracy of ± 3%. Range of sensor shall 0-90% RH and output shall be 4-20 ma. Housing material for transmitter shall be rated for NEMA 1 type applications.

13. CURRENT SENSING RELAY

Veris Industries Hawkeye H-701, or approved equal, digital output current sensor with adjustable threshold, digital (binary) output, AC output: 0-135A (1.OA turn-on).

14. HIGH LIMIT STATIC PRESSURE SWITCH

High limit static pressure sensors shall have a range of 0 to 6 inches WG. The body shall be constructed of die cast aluminum with a silicon rubber diaphragm. Device shall shutdown unit and alarm Central Controller when tripped.

15. DIFFERENTIAL PRESSURE TRANSMITTER

Shall have a minimum range of 0 – 6 inches WG. Accuracy shall be ± 1 %. Output signal shall be 4–20 ma.

16. LIQUID IMMERSION TEMPERATURE

Sensors shall be RTD, balco or solid state devices for all hot and chilled water temperature applications. The temperature range shall be 32 to 212 degrees F. Provide brass or stainless steel thermowells and install sensor probe with heat conductive grease. Probe and sensor head shall be removable without breaking fluid seal. In-stall sensors in top of pipe for horizontal runs and at a positive slope on vertical runs to prevent condensation from flowing to sensor head.

17. DRAIN PAN SAFETY SWITCHES

Safety switch shall sense presence of water and shall shutdown unit and alarm Central Controller when tripped.

18. VAV BOX CONTROLLERS AND WALL SENSORS

A. LONMARK or BACnet DDC controllers shall have integrated actuator and pressure transducer with plenum rated enclosure. Integral actuator shall include manual override button and travel limit stops. Actuator shall mount directly over damper shaft of the terminal box. Minimum torque rating of actuator is 53 lb.-in. Actuator shall have a minimum of three digital outputs for heating and/or fan control. Actuator shall be 24Vac.

B. LONMARK, BACnet and/or digital Wall sensors shall be of the digital type with plug-in communications jack. Sensor shall display zone temperature, setpoints actual air flow, etc.

19. LOCAL CONTROL CABINETS:

A. A control cabinet shall be provided in each mechanical room which will contain all pressure-electric switches, receiver-controller, high-low pressure selectors, temperature and pressure indication, etc. as described under PART 3 - EXECUTION.

B. This panel shall be constructed of extruded aluminum alloy frames with all corners securely riveted and supported by angle brackets. The panel is to have removable face and back panels that are to be made of aluminum bonnet on both sides over a plywood core. The panel door is to be supported by a non-removable piano-type hinge that spans the entire height of the panel. A keylocking latch is to be provided on all panels to insure only authorized access.

20. CONTROL SYSTEM HARDWARE

A. The Control System shall be comprised of a network of various independent LON based Digital Controllers as specified, to provide centralized access and facility wide control functions. The DDC Controllers shall be interconnected in a communicating network to provide facility wide access and sharing of information.

B. The distributed communication network system shall consist of a multi-drop RS-485, or other, as recommended by the manufacturer, bus architecture connecting DDC Controllers. The trunk shall consist of:

C. A twisted pair of wires (18 or 22 awg) run in metallic conduit if subject to physical damage, or a twisted shielded pair of wires (18awg) with the shield grounded in accordance with the manufacturer's wiring practices.

D. There shall be no power wiring, in excess of 30 Vac , run in conduit with communications trunk wiring. In cases where power or signal wiring is run in conduit with trunk wiring, all communications trunk wiring and power wiring shall be run using separate twisted shielded pairs (18awg) with the shields grounded in accordance with the manufacturer's wiring practices.

21. DDC LONMARK UNIT CONTROLLERS

A. Controls shall be LONMARK compliant with the capability to function in either a standalone mode or as part of a FTT-10 free topology network. All sensing inputs shall be provided via industry standard signals. Temperatures, humidities, differential pressure signals, and other signal inputs shall be one of the following types:

- 0-20 ma
- 0-5 VDC
- 0-12 VDC
- 1000 ohm platinum
- 1000 ohm Balco
- 10 k ohm Thermistor

B. All signal inputs shall be compatible with the controllers used, and with the requirements for readout of variables in true-scaled engineering units as specified.

C. Modulating outputs shall be industry standard 0-20 mA. Drive open/Drive closed type modulating outputs are acceptable provided that they also comply with the following requirements.

D. The controller shall provide LED indication of transmit/receive communications performance as well as for the proper/improper operation of the controller itself.

E. The controller shall be mounted in a NEMA 1 enclosure. Controller shall have as a minimum the following point configuration: (2) Digital Inputs, (3) Universal Inputs, (6) Digital Outputs, (2) Analog Outputs.

F. For compatibility to the environment of the mechanical systems, the Controller shall have ambient service ratings of -40 Degrees F to 140 Degrees F. Controllers shall be microprocessor based. Controllers shall be provided for air

handling units, pumps, chillers, boiler and other applications as shown on the drawings.

G. All input/output signals shall be directly hardwired to the Controllers. Trouble shooting of input/output signals shall be easily executed with a volt-ohm meter (VOM). As a result of this intent, it is specified that power line carrier systems, or other systems which command multiple outputs over a single pair of wires, shall not be used.

H. Controllers shall be in continuous direct communication with the network that forms the EMCS. The Controllers shall communicate with the SDC at a baud rate of not less than 19,200 baud.

I. All control sequences programmed into the Controllers shall be stored in non-volatile memory, which is not dependent upon the presence of a battery to be retained. Power failures shall not cause the memory to be lost, nor shall there be any need for batteries to be recharged or replaced to maintain the integrity of the controller database.

J. All control sequences shall be fully field programmable at the controller, allowing for the creation or editing of an application sequence of operations.

22. DDC LONMARK NETWORK CONTROLLER

A. Controller shall be LONMARK compliant and shall be multi-user, multi-tasking. The Network Controller is the interface device for communicating with any LONWORKS device using block programming in combination with the LONTALK protocol. The Network Controller shall be fully compatible with existing facility controllers, and shall have a complete set of energy and facility management capabilities. The Network Controller shall connect to other area controllers through either an RS-232 trunk or an Ethernet/Echelon trunk. The Network Controller shall function in either a standalone mode or as part of a FTT-10 free topology network

B. In lieu a gateway device such as a Network Controller, the control provider may opt to provide an industry standard LonMark or BACnet router for communication between the DDC controllers and Enterprise Buildings Integrator Server.

23. CENTRAL HEADEND COMPUTER WORKSTATION

A. The Central Headend Station shall consist of a Computer Platform, Color Display with Display Adapter, Peripheral Devices, Remote Support, and Operating System. Locate where shown on the drawings.

B. Provide a new Operator's Terminal for the Julia Street Terminal. This Julia Terminal must be integrated with the Erato Street Terminal Operator station as described in the general conditions of this section. The Julia Operator Terminal must have full graphics, trending, scheduling, historical data and overall DDC management capabilities (command and control) of the Erato Street BAS.

C. The BAS contractor shall provide an IBM compatible Industry Standard Architecture (ISA) with the minimum requirements of Pentium III, 800 MHz, 10.0 gigabyte hard drive, 64 MB of RAM, and 48X CD Read/Write drive. The computer shall have a battery backed up real-time clock. The real-time clock shall provide time-of-day, month, year, and day-of-week information. Parallel, serial, keyboard, and mouse ports shall be provided for connection of peripheral devices.

D. The BAS contractor shall provide high-resolution 17-inch (minimum) flat panel color monitor. The display shall have as a minimum a .26 dot pitch.

E. The BAS contractor shall provide a 2-button bus type mouse. This mouse shall be connected to the computer directly.

F. The BAS contractor shall provide an Enhanced 101-key keyboard.

G. The BAS contractor shall also provide a Report/Alarm Printer. The printer shall be capable of graphics and at least 286 characters per second for data print. The printer shall be of laser print quality.

H. The owner shall provide an internet connection for the ability of monitoring and controlling the HVAC system from a remote location. The owner shall incur the expense of the internet connection line or allow the use of the facility's IT Infrastructure.

I. The BAS contractor shall provide one copy of Microsoft Windows XP or Windows 2000 as a minimum.

24. INDOOR AIR QUALITY SENSOR

A. The IAQ sensor shall contain a minimum of 5 values on one sensor platform. The minimum values shall be: temperature, humidity, CO, CO2 and odors and gasses (O&G). The Odors & Gases (O&G) sensor shall be responsive to organic and inorganic gases. At a minimum, repeatable response should be to hydrocarbon gases with similar chemical structures such as toluene, isobutylene and isopropyl alcohol as well as ammonia, ethanol and hydrogen sulfide.

B Output to this group of gases shall be in a 0-100% range to indicate a relative increase or decrease in O&G concentration.

Value	Minimum Accuracy	Minimum Resolution
Temperature	±.5° C (0.8°F)	0.1°C (0.18°F)
Humidity	±10% of reading or 5% rh whichever is greater	1% rh
CO	±10% of reading or 5 ppm whichever is greater	1 ppm
CO2	±5% of reading or 100 ppm whichever is greater	10 ppm
O&G	±10% of reading or 5% O&G whichever is greater	1% O&G

Value	Minimum Range
Temperature	0-38°C (32 to 100°F)
Humidity	0-100% rh non-condensing
CO	0-200 ppm
CO2	0-2,000 ppm
O&G	0-100%

C. The IAQ sensor shall be wall mounted. A mounting plate shall be provided which will allow for all power and communication wiring terminations to be completed before installation of the sensors. All sensors shall be mounted on a separate circuit board that can be easily connected and removed from the mounting plate.

D. The IAQ sensor shall come pre-calibrated from the factory to maintain the minimum accuracies for a period of no less than three years. The IAQ sensor shall be capable of factory re-calibration.

E. The IAQ sensor shall be LonMark® certified and provide 3 SNVT values over a single twisted pair of wires. The IAQ sensor manufacturer shall provide an accompanying .xif file and/or plug-in.

F. The IAQ sensor shall be powered by 24 to 41vdc or 24vac and not exceed 4 watts.

25. GUARANTEE

All components, parts and assemblies shall be guaranteed against defects in material and workmanship for a period of one year after acceptance. Guarantee commences at time of acceptance and continues for the previously indicated duration.

26. SOFTWARE LICENSE AGREEMENT

The Owner shall sign a continuance of the current license agreement copy held with the manufacturer. Such license shall grant use of all programs and application software to Owner as defined by the manufacturer's license agreement, but shall protect manufacturer's rights to disclosure of trade secrets contained within such software.

PART 3 – SEQUENCE OF OPERATION

27. CHILLED WATER SYSTEM

A. A start signal shall be given from the DDC control panel to the Lead Chilled Water Pump. When flow is proven through a differential pressure switch, the chiller shall be energized. The chiller shall then cycle around its internal controls to maintain a chilled water supply setpoint of 45 degrees F (adj). Should outside air temperature fall to 35 degrees F, the chilled water pump(s) shall be energized to circulate water and prevent pipes from freezing. Chiller shall be locked out when outside air falls to 45 degrees F (adj). Chiller and associated chilled water pump(s) shall be energized when any AHU is energized during normal hours or overridden on during normal unoccupied hours, as long as the outside temperature is above 45 degrees F (adj).

B. The Chiller shall have a Factory provided and installed Microprocessor control system to allow the operator to be able to view setpoints, change setpoints, view current temperatures, view status of equipment, etc.

28. CONSTANT VOLUME AIR HANDLING UNITS

A. The Unit fan shall be started and stopped through the Hand-Off-Auto switch on the cover of the magnetic motor starter based on a time schedule from the central control panel. Once the unit fan is energized the automatic temperature control system shall be placed in operation and the outside air damper shall open to its minimum position.

B. Duct smoke detectors located in the supply air stream and the return air stream shall signal the Fire Alarm System and de-energize the unit fan should particles of combustion are sensed. Duct detectors shall be furnished and installed by Fire Alarm Contractor.

C. A space sensor shall modulate the 3-way chilled water control valve and energize the stages of electric duct heater as required to maintain a setpoint of 74 degrees F (adj). A space humidistat shall control humidity as here-in-after specified.

D. A manual reset, low limit thermostat shall de-energize the unit fan and close the outside damper if the coil entering air temperature falls below 35 degrees F.

E. A CO2 sensor/transmitter mounted in the return air of the AHU shall override the minimum position of the outside air damper and modulate the damper as required to maintain a space setpoint of ± 900 ppm.(adj.) and a setpoint of + 20 ppm (adj.)for CO.

F. Should the space humidity rise above 60%, during occupied hours, the chilled water valve shall go to the fully open position and the thermostat shall energize up to 50% of the electric duct heater as required to maintain a space setpoint of 74 degrees F (adj) and 60% RH (adj).

F. When the AHU is "off", in the unoccupied mode, and the space temperature falls to 60 degrees F, the unit fan shall be energized, the outside air damper shall remain closed and the space thermostat shall energize the electric heat to maintain a night setback temperature of 60 degrees F (adj). When the AHU is "off" and the space temperature rises to 80 degrees F(adj), the unit fan shall be energized, the outside air damper shall remain closed, the chiller/pump shall be energized, and the chilled water valve shall modulate open to maintain a space temperature of 80 deg. F(adj.). The chiller shall remain energized for a minimum of 30 minutes (adj). The chiller shall not be allowed to restart for a period of 30 minutes (adj).

G. Should the space humidity rise above 60% during unoccupied hours, the unit fan shall be energized, the outside air damper shall remain closed, the chiller/pump shall be energized, and the chilled water valve shall modulate open to maintain a leaving air temperature of 54 deg. F (adj.).. The chiller shall remain energized for a minimum of 30 minutes (adj). The chiller shall not be allowed to restart for a period of 30 minutes (adj). The 50% of the duct heating coil shall be available to prevent overcooling during unoccupied humidity override conditions.

H. AHU may be overridden "on" during normal unoccupied hours from override switch at the DDC panel. When unit is overridden "on", the lead chilled water pump and chiller shall be energized if outside air temperature is above 45 degrees F. Outside air damper shall open to its minimum position during override conditions and modulate as determined by CO2 sensor.

G. Install and wire the UVC lights along with the necessary safety switch.

H. Owner shall be able to view setpoints, change setpoints, view current temperatures, view status of equipment, view percent open/closed of valves, etc.

I. Provide a drain pan safety switch that shall shut the unit fan off, and notify the DDC control panel, when a preset level (adj.) of water is sensed in the secondary drain pan.

29. VARIABLE AIR VOLUME AIR HANDLING UNITS

A. Each Unit fan shall be started and stopped through the Hand-Off-Auto switch on the cover of the Variable Frequency Drive. Upon a signal to energize the unit fan, the outside air damper shall open to its minimum position, and the automatic temperature control system shall be placed in operation.

B. Duct smoke detectors located in the supply air stream and the return air stream shall signal the Fire Alarm System and de-energize the unit fan should particles of combustion are sensed. Duct detectors shall be furnished and installed by Fire Alarm Contractor.

C. A discharge air sensor shall modulate the 3-way chilled water control valve to maintain a discharge air temperature setpoint of 55 degrees F (adj.).

D. A static pressure sensor located 2/3 down the supply air duct shall modulate the VFD to maintain a setpoint of 1.5" wg (adj.).

E. A manual reset, low limit thermostat shall de-energize the unit fan and close the outside damper if the coil entering air temperature falls below 35 degrees F.

F. A manual reset, high limit static pressure safety switch shall de-energize the unit fan should its setpoint of 3.5 " wg (adj.) be reached.

G. An indoor air quality sensor/transmitter mounted in the space shall override the minimum position of the outside air damper and modulate the damper as required to maintain a space setpoint of $\pm$ 900 ppm(adj.) for CO2 and a setpoint of $\pm$ 20 ppm (adj.) for CO.

H. Individual DDC room thermostats shall maintain the room temperature setpoint of 74 degrees F (adj) cooling and 72 degrees F (adj) heating by modulating the VAV box DDC damper actuator and electric reheat coil as required.

I. When the AHU is "off" in the unoccupied mode, and the space temperature falls to 60 degrees F, the unit fan shall be energized, the outside air damper shall open to the minimum position, and the VAV boxes thermostats shall energize their respective electric reheat coils to maintain a night setback temperature of 60 degrees F (adj). When the AHU is off and the space temperature rises to 80 degrees F(adj), the unit fan shall be energized, the outside air damper shall open to the minimum position, the chilled water control valve shall go to the full

open position, the VAV boxes shall go to the full open position and the lead chiller and its associated pump shall be energized. The chiller shall remain energized for a minimum of 30 minutes (adj). The chiller shall not be allowed to restart for a period of 30 minutes (adj). When the space temperature falls to 76 degrees F (adj), the chiller, pump and AHU shall be deenergized.

J. Should the space humidity rise above 60% during unoccupied hours, the unit fan shall be energized, the outside air damper shall remain closed, , the chilled water control valve shall go to the full open position, the VAV boxes shall go to the full open position and the lead chiller and its associated pump shall be energized. The chiller shall remain energized for a minimum of 30 minutes (adj). The chiller shall not be allowed to restart for a period of 30 minutes (adj). When the space humidity falls to 56% (adj), the chiller, pump and AHU shall be deenergized.

K. Install and wire the UVC lights along with the necessary safety switch.

L. Owner shall be able to view setpoints, change setpoints, view current temperatures, view status of equipment, view percent open/closed of valves, etc.

M. Provide a drain pan safety switch that shall shut the unit fan off, and notify the DDC control panel, when a preset level (adj.) of water is sensed in the secondary drain pan.

30. EXISTING RELOCATED AIR CONDITIONING SYSTEMS

A. The Unit fan shall be started and stopped through the Hand-Off-Auto switch on the cover of the unit control starter based on a time schedule, or a signal from the DDC central control panel. Once the unit fan is energized the outside air damper shall open to its minimum position, and the automatic temperature control system shall be placed in operation.

B. Duct smoke detectors located in the supply air stream and the return air stream of each unit, shall signal the Fire Alarm System and de-energize the unit fan should particles of combustion are sensed. Duct detectors shall be furnished and installed by Fire Alarm Contractor.

C. In the “occupied mode”, an auto change over Space Sensor shall energize the compressors to maintain a space temperature of 74 deg. F(adj.) cooling, or energize the stages of the electric heating, as required, to maintain a space heating setpoint of 70 degrees F (adj). A space humidistat shall control humidity as here-in-after specified. The reverse shall occur, for each condition, when set point has been satisfied. The unit fan shall operate at all times during occupied mode to provide proper indoor air quality.

F. In the “occupied mode” an indoor air quality sensor/transmitter, mounted in the return air duct, shall override the minimum position of the outside air damper and modulate the intake O/A damper, as required, to maintain a space setpoint of ± 900 ppm(adj.) for CO2 and a setpoint of ± 20 ppm (adj.) for CO.

E. Should the space humidity rise above 55% RH (adj), during the “occupied mode”, the Humidistat shall override the cooling controls and provide dehumidification by operating the first stage of cooling, and up to 50% of the unit electric heating coil to prevent over-cooling, and to maintain a space setpoint of 74 degrees F (adj) and 55% RH (adj). The reverse shall occur, when humidity set point has been satisfied, and the normal occupied control sequence shall operate.

F. When the Unit is “off”, in the “unoccupied mode”, and the space temperature falls to 60 degrees F, the unit fan shall be energized, the outside air damper shall remain closed, and the space thermostat shall energize the stages of the electric heating to maintain a night setback temperature of 60 degrees F (adj). When the Unit is “off”, in the “unoccupied mode”, and the space temperature rises to 80 degrees F(adj), the unit fan shall be energized, the outside air damper shall remain closed, the stages of compressors shall be energized to maintain a space temperature of 80 deg. F(adj.). The reverse shall occur, for each condition, when set point has been satisfied.

G. Should the space humidity rise above 65% (adj.) during the “unoccupied mode”, the unit fan shall be energized, the outside air damper shall remain closed, the Humidistat shall override the cooling controls and provide dehumidification by operating the first stage of cooling, and up to 50% of the unit electric heating coil to prevent over-cooling, and to maintain a space setpoint of 74 degrees F (adj) and 60% RH (adj). The reverse shall occur, for each condition, when set point has been satisfied.

H. Each Unit may be overridden “on” during normal unoccupied hours from override switch at the DDC panel. When a unit is overridden “on”, the unit shall be energized and the normal “Occupied” control sequences shall occur. Outside air damper shall open to its minimum position during override conditions and modulate the intake O/A damper as determined by the IAQ sensor.

G. Install and wire the UVC lights along with the necessary safety switch.

H. Owner shall be able to view setpoints, change setpoints, view current temperatures, view status of equipment, view percent open/closed of valves, etc.

I. Provide a drain pan safety switch that shall shut the unit fan off, and notify the DDC control panel, when a preset level (adj.) of water is sensed in the unit drain pan.

31. MISCELLANEOUS

A. Interlock Exhaust Fan EF-1 with AHU-1, such that the EF shall operate whenever the AHU-1 is on and in the occupied mode.

B. Interlock Exhaust Fan EF-2 with AHU-2 such that the EF shall operate whenever the AHU-2 is on and in the occupied mode.

C. Interlock Exhaust Fan EF-3 with AHU-7(Existing Unit) such that the EF shall operate whenever the AHU-7 is on and in the occupied mode.

D. Exhaust Fans EF-4 and EF-5 shall be interlocked with the room light switch such that the fan runs whenever the lights are “on”.

E. Exhaust Fan EF-6 shall be controlled by a wall switch on the exterior of the room such that the fan shall be manually controlled by this switch.

32. ELEVATOR ROOM

Exhaust Fan EF-7 shall be controlled by a thermostat and a ceiling mounted space smoke detector. The fan shall be energized when the space temperature is above thermostat set point or should particles of combustion be sensed. Smoke detector shall be furnished and installed and wired to the Fire Alarm System by Fire Alarm Contractor.

33. ELECTRIC UNIT HEATERS

A space mounted thermostat shall energize the fan and stages of the heating coil of its respective unit heater to maintain a setpoint of 60 degrees F (adj).

34. POINT LIST

A. CENTRAL PLANT

	Digital	Digital	Analog	Analog

	Output	Input	Output	Input
PM-1 Start/Stop	X			
PM-1 D.P. Status		X		
PM-2 Start/Stop	X			
PM-2 D.P. Status		X		
Chiller 1 Start/Stop	X			
Chiller 1 Status			X	
Chiller 1 Alarm			X	
Chiller 1 Supply Temperature				X
Chiller 1 Return Temperature				X
Outside Air Temperature				X

B. CONSTANT VOLUME AHUS

	Digital Output	Digital Input	Analog Output	Analog Input
Fan Start/Stop	X			
Fan Status		X		
Chilled water valve				X
Outside Air Damper				X
Return Air Damper				X
Heating Coil		X		
Space Temperature				X
Discharge Temperature				X
Space Humidity				X
Carbon Monoxide				X
Carbon Dioxide				X
Odors & Gases				X
Drain Pan Safety Switch		X		

C. VAV AHUS

	Digital Output	Digital Input	Analog Output	Analog Input
VFD Start/Stop	X			
VFD Status		X		
VFD Control			X	
Static Pressure				X
Outside Air Damper			X	
Chilled Water Valve			X	
Low Limit Thermostat			X	
High Limit Static Pressure		X		
Space Humidity				X
Space Temperature				X
Carbon Monoxide				X
Carbon Dioxide				X
Odors & Gases				X
Drain Pan Safety Switch		X		

D. DDC VAV BOXES

	Digital Output	Digital Input	Analog Output	Analog Input
Cooling Setpoint				X
Heating Setpoint				X
Space Temperature				X
Discharge Temperature				X
Damper Control			X	
Reheat Coil	X			
CFM				X
Min CFM Setting				X
Max CFM Setting				X

E. RELOCATED DIRECT EXPANSION UNITS

	Digital Output	Digital Input	Analog Output	Analog Input
Fan Start/Stop	X			
Fan Status		X		

Compressor status		X		
Outside Air Damper			X	
Return Air Damper			X	
Heating Coil	X			
Space Temperature				X
Discharge Temperature				X
Space Humidity				X
Carbon Monoxide				X
Carbon Dioxide				X
Odors & Gases				X
Drain Pan Safety Switch		X		

END OF SECTION

SECTION 16010 - ELECTRICAL GENERAL

PART 1 - GENERAL

1. SUMMARY

A. Furnish all labor, tools, materials, fixtures, equipment, accessories, transportation, etc., required for complete electrical lighting and power systems, complete with necessary auxiliaries as indicated on drawings and as hereinafter specified.

B. The GENERAL CONDITIONS of the Contract and Architectural Drawings and Specifications shall apply to all work under this Section. Separation of Specifications into Sections is for convenience only and is not intended to establish limits of work or liability. The following are the Sections that apply to this project.

16010 - Electrical General
16050 - Electrical Materials and Methods
16400 - Electrical Service
16500 - Lighting Fixtures
16600 - Public Address and Music System
16760 - Fire Detection and Alarm System
16840 - Telecommunications Distribution Systems
16900 - Electrical Equipment Connections

C. In general, the work shall consist of the following installations:

1. The removal and/or abandonment of all existing conductors and raceways and the re-circuiting of the new devices, fixtures and equipment as required on the drawings,
2. Renovations to existing electrical services and new electrical distribution.
3. Panelboards, feeders, switches and complete systems per plans.
4. Power wiring to all mechanical and air conditioning equipment.
5. Electrical lighting and appliance systems complete with wiring, fixtures and lamps.
6. Wiring and connections for equipment. devices and fixtures as indicated on the drawings.
7. Furnish labor, materials, equipment, engineering, and services, and perform all operations to install the telephone and data wiring and conduit for the systems.
8. Complete raceway system with junction boxes for security systems.
9. Complete and operational Fire Alarm System.
10. Complete and operational Public Address and Music System.

D. Prior to submitting quotation for electrical work, Contractor shall visit and examine the job site in order to become familiar with all existing conditions

pertinent to the work to be performed thereon. No additional compensation will be allowed for failure to be so informed.

E. It is the intent of these specifications that in all particulars, the materials and workmanship shall conform to the best practice and that the equipment and accessories as furnished and installed shall be complete and ready to operate.

F. All materials shall be new, except where otherwise indicated, and shall conform to the standards of underwriters' Laboratories in every case where such a standard has been established for the particular type of material in question.

G. The drawings showing the layout of electrical work indicate approximate location of the outlets, receptacles, panelboards and other electrical equipment, unless noted otherwise. The runs of feeders and branches are schematic only and are not intended to show the exact routing of conduits. The final determination of the routing shall be governed by existing and structural conditions, other conditions and other construction. The electrical Contractor shall consult all drawings which may affect the location of any outlet, apparatus, or equipment to avoid possible interference, and any reasonable changes in the location of an outlet, apparatus or equipment, up to the time of rough-in, is reserved by the Architect, and any minor deviations shall be made without additional cost. It shall be the Electrical Contractor's responsibility to see that all equipment such as junction boxes, panelboards, switches, and other apparatus, that may require maintenance from time to time, are made easily accessible. Although the location of the equipment may be shown on the drawings, the construction may disclose the fact that such location does not make its position readily accessible, in which case the Electrical Contractor shall call the Architect's attention to the condition before advancing the construction to a point where a change in location would require additional cost.

H. The word "provide" as used in these Specifications and on the Drawings shall be termed to mean "furnish and install".

2. MEASUREMENTS

Because of the small scale of the drawings, it is not possible to indicate all offsets, fittings, and accessories necessary. The Contractor shall carefully investigate structural conditions, walls, furring and chase locations and room finishes and shall make actual measurements on the job so that the panelboards, switches, receptacles, lighting fixtures and accessories shall fit.

3. LAWS, CODES AND PERMITS

A. Latest edition of the following listed established standards constitute part of the specification requirements.

National Electrical Code, 2008 (NFPA No. 70)
Applicable State Requirements
Underwriters' Laboratories (UL)
Electrical Testing Laboratories (ETL)
American National Standard Institute (ANSI)

B. All electrical wiring shall confirm to the requirements of the International Building Code 2006 edition as amended by the National Electrical Code (NFPA – 70) and such other applicable safety codes as enforced by the Safety & Permits Department (New Orleans Amendments to the International Building Code 2006 edition – articles 101.4.1, 106.1,2701)

C. The Contractor shall apply for all permits and pay all fees incidental to the carrying on of the electrical work. This Contractor shall give notice to the Architect in ample time for the work to be inspected and approved as it progresses and no work shall be concealed until inspected and approved by Architect, should the plans or these specifications in any way conflict with the Code, or State Rules, these latter are to be followed, without expense to the Owner, but the Architect shall be notified of this condition and approval secured before changes are made.

D. Upon completion of the installation, a certificate of approval from the Electrical Inspection Department having jurisdiction thereon shall be furnished to the Owner, and all fees paid by the Contractor. The certificate of inspection shall not release the contractor from any defects to material, workmanship or installation, should any develop within one (1) year after final acceptance of the work.

4. JOB CONDITIONS

A. Accompanying drawings, including plans, details, diagrams, notes, etc., are shown to limit and explain structural conditions, construction requirements, sizes, capacities and method of installation and erection. Structural and other conditions may require certain modifications and adjustments from conditions shown. Such deviations are permissible; however, specific sizes capacities and requirements affecting the satisfactory performance and operation of the installation shall remain unchanged. Make allowance for normal job conditions and interferences.

B. Ask for details whenever uncertain about method of installation. Lack of details not requested shall not excuse improper installation and correction shall be responsibility of the Contractor.

C. Schedule and perform all electrical work to avoid delays to the Project and other trades.

D. In addition to the basic work covered under this contract, the Contractor shall plan and schedule the work to permit continuous operation of essential services of existing facilities. Planning shall also include scheduling necessary interruptions of electrical service to existing building at times when such interruptions will cause minimum interference with existing routine and services. All such interruptions shall be made only after consultation with the Owner. This is extremely important since included in the work is a relocation and rerouting of and connecting to existing facilities. No additional compensation will be allowed for failure to be so informed.

E. It is essential that all adjacent buildings be kept in operation at all times, except when specific permission is given to contrary. Before any power or equipment is shut down for disconnecting, tie-ins, or rearranging of services, make arrangements with Owner to do this work at night, or Sunday, or at special time of day or year with length of shutdown agreed upon before work is begun. Contractor to bear any overtime or work costs in this connection.

F. All piping, conduits, conductors and other electrical items in way of construction, shall be rerouted, relocated or otherwise adjusted to work out with such construction or changes shown or specified in any or all of various sections of specifications. Any conflicts that are encountered will be referred immediately to Architect for method of disposition before continuation of work.

E. This Contractor shall review the architectural drawings to become familiar with the phasing of construction required for this project.

PART 2 - PRODUCTS AND INSTALLATION

5. APPROVALS

A. Substitutions shall be submitted in accordance with the Instructions to Bidders, and all provisions thereof.

B. All material, equipment, methods, and accessories entering into the work under this section of contract are subject to approval or disapproval of the Architect. Approval of any manufacturer, material, or product shall not constitute a waiver of Architect's right to demand full compliance with contract requirements, including shape, size, quality and performance.

C. Equality of materials is that established by opinion of the Architect. Decision of the Architect is final.

D. Whenever a material or article of equipment is specified by use of a proprietary name, or by naming the manufacturer or vendor, any material or article which will perform adequately the duties imposed by the design will be considered, providing

it is of equal substance, and function, meets specifications, and is acceptable to the Architect, and submitted for prior approval in accordance with the specifications. Any manufacturer and model number specified on the drawings or in the specifications is provided for convenience only, and the description and specification accompanying the model number shall dictate the requirements of the product, and supersede the performance, quality, and materials implied by the model number where a conflict may occur.

E. Include literature, technical data, etc., and samples if necessary, with all submissions. Burden of proof that material offered for substitution is equal, or superior, in construction and efficiency to that named, rests on Contractor, and unless proof is satisfactory to the Engineer, substitution will not be approved.

F. Within thirty (30) days after award of General Contract, Contractor shall submit complete dimensional shop drawings and descriptive literature covering the following equipment and materials. Written approval thereof must be obtained before ordering or installation.

Panelboards	Wiring Devices and Plates
Safety Switches	Lighting Fixtures
Conductors	Fire Alarm System
Public Address System	Transformers
Main Switchboards	Tel/Data wiring and devices

G. Comply with requirements of Division 1 Sections regarding submittals, number of copies, and procedures.

6. PROTECTION OF FIXTURES, MATERIAL AND EQUIPMENT

A. Contractor shall continuously maintain adequate protection of all his work from damage and shall protect the Owner's property from injury or loss, except as may be caused by agents or employees of the Owner. He shall adequately protect adjacent property as provided by law.

B. Conduit openings shall be capped or plugged during installation. Fixtures and equipment shall be tightly covered and protected against dirt, moisture, chemical and mechanical injury. At the completion of the work, the fixtures, material and equipment shall be thoroughly cleaned and delivered in condition satisfactory to the Architect.

7. CUTTING, PATCHING, AND SEALING

A. All cutting and patching for the work of this Section shall be in accordance with the requirements of the GENERAL CONDITIONS. The Contractor shall perform all necessary cutting and patching required for the installation of work. Where floor or roof is cut or penetrated the structural integrity shall be maintained or restored.

Cutting of structural members is prohibited except with prior approval of the Architect.

B. Penetrations of all walls, floors, and ceilings shall be sealed with a material capable of preventing the passage of flames and gases in accordance with the requirements of the test standard ASTM-E-814 for fire stops. The integrity of the fire rating, as indicated on the architectural drawings, shall be maintained.

8. CLEANING UP

A. This Contractor shall promptly remove from the jobsite all debris, surplus and waste materials, empty crates and cartons resulting from his work.

B. This Contractor shall remove all oil, grease or other stains resulting from his work performed in the building or the exterior thereof.

9. TESTING AND BALANCING

A. Make tests which may be required by the Owner or the Architect in connection with the operation of the electrical system in the building.

B. Balance all single phase loads connected to the panelboards in the building to insure an approximate equal division of these loads on main secondary power supply serving the building.

C. All tests shall be made in accordance with the latest standards of the IEEE and the NEC.

D. The installation shall be tested for performance, grounds, and insulation resistance. "Megger" type instrument shall be used. Circuit continuity tests and operational tests on all equipment furnished and/or connected by him shall be made by the Contractor after such equipment has been installed.

E. The Contractor shall provide all testing equipment and all costs shall be borne by him. Written reports shall be made of all tests in accordance with paragraph 2.10 “Commissioning”. All faults shall be corrected immediately.

10. PAINTING, DIRECTORY CARDS, AND LABELS

A. Contractor shall touch-up or refinish all items of electrical equipment furnished with a factory finish coat of paint and which may have been damaged regardless of cause.

B. All electrical equipment such as switches, panelboards, motor controllers, etc., shall be suitably identified with micarta nameplates.

C. Provide in the directory frame of each panelboard and for each feeder switch or circuit breaker, neatly typed directory cards indicating the general area and type of electrical load

D. See PAINTING SECTION for painting by others.

11. GUARANTEE

Upon completion of all tests and acceptance, the Contractor shall furnish the Owner a written guarantee covering all electrical work under this Contract for a period of one (1) year from date of final acceptance. Upon notice from the Owner, Architect or the Consulting Engineer during the Guarantee period, the Contractor shall replace defective materials and correct faults of workmanship and repair any damage caused thereby promptly and free of any charge. Fuses and lamps are excluded from the guarantee.

12. CONTRACTOR'S QUALIFICATIONS

The Electrical Contractor, bidding on this portion (Electrical Division) must be licensed to perform such work as required by State and Local laws.

13. SUBSTITUTION

A. All specified material, equipment, fixtures, etc., entering into the work under this section of contract are subject to the prior approval or disapproval of the Architect. Refer to Division 1 Sections for approval procedures.

B. Materials, equipment, fixtures, etc., herein named, described, or indicated on drawings establish the type, size, appearance and quality required of products other manufacturers must meet to be acceptable.

C. Requests for substitutions must include necessary data to conclusively demonstrate equality in type, size, appearance, quality, etc. Any deviation or lack of information, in the opinion of Architect or Consulting Engineer, may be cause for rejection.

D. REFER TO APPENDIX #1 FOR LISTING OF ADDITIONAL PRIOR APPROVED ELECTRICAL LIGHTING FIXTURES, EQUIPMENT AND APPURTANCES.

14. COMMISSIONING

A. Contractor shall install all items of equipment as identified in this specification in strict accordance with manufacturer’s requirements (whether identified in this specification or not), shop drawings and contract documents. Contractor shall coordinate with all trades to insure a complete and proper installation. Start-up of all equipment shall be by the contractor, and if required or requested, by a

manufacturer authorized representative. Start-up services shall be provided for as long a period of time as is necessary to insure proper operation of the system or equipment items. The start-up technician shall conduct all operating tests as required to insure the equipment is operating in accordance with design parameters. Complete testing of all safety and emergency control/backup devices shall be made. The start-up technician shall submit a written report to the engineer (prior to final punch list inspection) containing all test data recorded as required above and a letter certifying that the equipment is operating properly.

B. Other specific items of commissioning shall be as follows:

1. All electrical outlets and devices shall be tested for proper operation. Receptacles shall be checked for proper hot, neutral and ground connections with suitable plug-in tester. Light switches and dimmers shall be switched to check that the correct lights are controlled and that dimmers operate properly.

2. Test and balance all switchboard, panelboard, and power feeders 60 amps and above in accordance with 16010-2.5.

3. Measure voltage and ampacity at each panelboard and switchboard under full load conditions (as best as can be achieved) for each phase. Adjust transformer taps as required to maintain design voltage.

4. The Electrical gear equipment supplier shall perform a selective coordination and fault current study based upon the as-built condition of the power distribution system. The study will take into consideration the as-built length of conductors, an estimate of actual load conditions of the feeders, and fault-current and impedance information provided by the utility. Calculations shall be performed to determine the performance requirements of all circuit breakers, and all safety switch fuses 60 amps and above. As a result of this study, Supplier shall provide recommended settings and adjustments for all electronic, GFI and adjustable breakers. Applicable Time/current characteristic curves shall be provided for review by Consulting Engineer accordingly.

5. Test fire alarm system in accordance NFPA-72 and Section 16760 requirements. Test proprietary fire alarm reporting.

6. Test and put into operation the complete public address system and instruct the Owner’s representative in the operation and maintenance of the system.

7. Provide written reports for all tests and studies described above prior to final punch list inspection.

END OF SECTION

SECTION 16050 - ELECTRICAL MATERIALS AND METHODS

PART 1 – GENERAL

1. RELATED DOCUMENTS

   Applicable items of this Section shall apply to all sections of ELECTRICAL.

PART 2 - PRODUCTS AND INSTALLATION

2. METHODS OF WIRING

   A. No wire shall be smaller than No. 12 except those for fixture drops and for control circuits of equipment. All wire shall have 600-volt insulation equivalent to type THHN/THWN unless otherwise noted on the drawings. All wiring shall be run in conduit, unless specifically noted otherwise. MC cable may not be used in this project.

   B. Conductors shall be continuous from outlet to outlet and no splices shall be made except in outlet or junction boxes.

   C. Homeruns to panelboards may be collected in one or more conduits provided all circuiting is done in accordance with Code requirements and the maximum unbalanced current does not exceed the capacity of the neutral conductors.

   D. Powdered soapstone or approved pulling compound shall be used as a pulling lubricant for all non-lead covered conductors. Use Thomas and Betts Wireslick, Ideal 77 or approved equal.

   E. All empty conduits installed shall contain a #14 fish wire.

   F. Conduit sizes shall conform to the requirements of the National Electric Code and/or sizes shown on the drawings. Minimize size conduit routed above grade shall be 1/2". Minimum size conduit routed below grade shall be 3/4”.

   G. All conduit associated with feeders and branch circuits shall be routed concealed above ceilings or below the first floor slab. No conduit shall be installed within concrete floor slabs, except as required to serve floor boxes, or as approved by the architect and structural engineer. Where installed to serve floor boxes, conduit shall be routed to nearest wall and turned up. Where conduits transition through or out of first floor slab, conduits shall be transitioned to galvanized rigid steel. PVC conduits are not allowed to transition through slab. In area below a distribution panel, contractor shall provide enhancement of reinforcing as required by structural engineer. Conduits routed below the first floor slab shall supported individually using 1/4" stainless steel threaded rods, wrapped around

conduit and bent over reinforcing steel in slab. Supports for multiple conduits shall be 1/4” stainless steel, and wrapped around entire rack, with both ends routed vertical and bent over reinforcing steel. All supports shall be vertical with respect to conduit, and turned at 90° over two separate reinforcement bars, spaced minimum 6” apart. Contractor shall add a short reinforcing bar as needed to achieve 90° angle. Supports shall be spaced in accordance with NEC-344.30. Any conduit exposed to weather shall be heavy wall hot dipped galvanized rigid conduit, or the case of final equipment connections, liquid-tight, flexible metal conduit.

H. Underground conduits for service entrance conductors, and/or as noted on drawings shall be Schedule 80 PVC and shall be at least 36" deep as measured from grade to top of conduit. Underground conduits for branch circuit conductors shall be Schedule 40 PVC direct buried minimum 24" below grade. Sweep elbows shall be galvanized rigid steel, with minimum 36” radius. All underground conduits shall be installed with metallic marker tape buried 12" below grade, directly above conduit, and continuous for entire length of conduit.

I. Conduits in metal stud walls, exposed within mechanical and electrical rooms, and above ceilings shall be EMT. Conduits in hollow cmu walls shall be EMT with concrete tight set screw fittings. Conduits in solid, infilled cmu walls shall be Schedule 40 PVC. All conduits shall be concealed, except within mechanical, electrical, and elevator equipment rooms. Conduits above ground, on the exterior of the building shall be heavy wall galvanized rigid steel.

J. Aluminum conduit may be used in lieu of steel conduit in sizes over 2" provided same does not run underground or in or passing through concrete.

K. All raceways shall be concealed unless otherwise indicated.

L. All conduit and tubing shall be Armco, Plastic Wire & Cable, Steelduct, Republic, Allied, or approved equal.

M. Branch circuit conduits feeding outlets in masonry walls shall be concealed in masonry. Where outlet boxes are indicated in bare masonry walls, the box shall be mounted so that two edges of the box or plaster cover will fall in a mortar joint. Where switchboxes will not accommodate the number of conductors required and 4" square or larger boxes are installed, the device covers shall be manufactured by Steel City Manufacturing Co., or Appleton, 1" minimum in depth, with straight rectangular openings for drywall construction. Where grouting is required to fill up improperly cut openings in the masonry, the work will be rejected. Electrical Contractor shall cooperate with the bricklayer to insure a neat and workmanlike job.

N. Solderless Fixed spring connectors (T & B 10-100, Ideal wrap-cap, or equal) shall be used for all branch circuit wiring and fixture connections on all

conductors #10 AWG and smaller. Split bolt or 2 bolt connectors (T & B 6 HPW, O-Z Gedney PMX, or equal) shall be used for connections and splices on all conductors #8 AWG or larger.

O. Connections to all motors not equipped with a portable cord shall be made with a short piece of flexible metal conduit between rigid conduit system and motor terminal box. Ground bond of separate copper conductor shall be made between motor frame and rigid conduit system. In all outdoor locations, liquid tight flexible metal conduit shall be used.

P. All recessed fixtures, unless they contain a box approved for THW wire shall be wired with THHN, in four feet (4') of flexible metal conduit from a box at least one foot (1') from the fixture. Not more than two individual or two rows of continuous fixtures shall be connected to any one of these outlet boxes. This box shall be located above the ceiling and shall be accessible by removing fixture. Installation of blank covers on ceilings to provide access to such boxes will not be acceptable.

Q. Splices in all low voltage wiring shall be made at terminal blocks furnished with the equipment. At junction boxes or where other splices are required, these splices shall be soldered.

R. Other routings than those indicated may not be used without the approval of the Architect, but Contractor shall make allowance for possible obstructions to routes indicated. Conduits shall be grouped together and run on common hangers parallel to building lines in areas of open ceilings.

3. WIRING IN RACEWAYS

A. Conduit sizes shall conform to requirements of the National Electrical Code and/or sizes shown on drawings.

B. It is not mandatory that all conduits be routed as shown on the drawings. Other routings facilitating speed and ease of installation may be used, provided the general intent of these specifications is followed and the specific intent of the particular circuit or circuits and the National Electrical Code are not violated. Contractor shall become thoroughly familiar with the structural and architectural design and determine conduit routing prior to the forming of any slabs. Contractor shall make full allowances for possible obstructions to these routes, as no extra charges will be allowed for added lengths that may be necessary.

C. Conduits shall be installed in a neat appearing manner and shall be rigidly secured in place. The use of wooden plugs in masonry or concrete as a base to fasten raceways will not be permitted. Approved anchors only shall be used for this purpose. Exposed conduits shall be installed with runs arranged parallel or perpendicular to walls and ceilings, with rigid angle turns consisting of

symmetrical bends, condulets and junction boxes. Bends and offset shall be held to a minimum. Conduits shall be kept at least six (6") inches from parallel runs of hot piping flues, or other hot objects.

D. Conduits shall be cut with a hacksaw; ends must be square, threads cut and cleaned before reaming. Conduits must be securely fastened to all outlet and junction boxes with two locknuts and one bushing of approved make, care being exercised to see that full number of threads project through to permit bushings to butt up tight against the end of the conduit, after which the locknuts shall be screwed tight. Conduit shall be joined by approved conduit couplings and shall have ends butted in all cases where couplings are used. Use three piece threaded electrical unions where standard couplings cannot be used. The use of running threads will not be permitted. Where condulets cannot be joined by standard thread couplings, approved type conduit unions shall be used. Connectors and couplings for electric metallic tubing shall be of the set-screw type. Couplings for rigid heavy-wall conduit shall be of the threaded type.

E. No conduit or wiring of any type shall be routed inside or through elevator shaft and equipment room, except as required to serve equipment therein.

F. Conduit fittings shall be Crouse-Hinds or Appleton grounding type, or equal.

G. Insulated bushings shall be provided for all conductors #4 and larger.

H. No wire shall be pulled in until the conduit system is complete and plastering dried. This does not include the white finish coat of plaster.

I. During Construction, all outlet boxes and conduit stub-ins shall be suitably protected against the entrance of foreign material.

4. BOXES AND FITTINGS

A. Boxes and fittings shall conform to requirements of Article 314 of the N.E.C.

B. Junction and pull boxes required by field conditions shall be installed whether indicated on drawings or not.

C. The location of outlets not specifically dimensioned on the drawings should be considered as approximate only. The Contractor shall study the general plans with relation to the spaces surrounding each outlet in order that his work fit the work of others so that when fixtures or other fittings are installed, they will be symmetrically located according to design requirements.

D. Use only galvanized outlet and junction boxes, conduit fittings, covers, and supports for interior wiring and cast fittings and boxes with gasketed covers for exterior wiring. The Contractor shall provide all necessary structural supports for

boxes and cabinets. Kindorf or Unistrut channels shall be used where applicable.

E. Boxes for concealed outlets shall be 4" square by 2" deep, or larger, with raised device covers as required, except that 1-1/2" deep switch boxes may be used where only one conduit enters a box.

F. Boxes for concealed ceiling outlets shall be 4" octagonal by 1-1/2" deep, or larger. Boxes in plaster ceilings shall have plaster covers. Fixture outlet boxes shall be equipped with fixture studs secured to the boxes.

G. Outlet boxes for exposed work shall be 4" square by 1-1/2" deep, or larger. Boxes shall have Appleton 1/2" deep surface metal covers to accommodate the devices indicated, or approved equal.

H. In walls or ceilings of concrete, tile or other non-combustible material, boxes and fittings shall be so installed that the front edge of the box or fitting will not set back of the finished surface more than 1/4". In walls or ceilings constructed of wood or other combustible material, outlet boxes and fittings shall be set flush with the finished surface.

I. If a fixture, canopy or pan is used as an outlet box cover, any combustible wall or ceiling finish between the edge of the canopy and the outlet box shall be covered with non-combustible material.

J. Fixture studs shall be installed in all fixture outlets. In each case, the maximum permissible number of conductors shall be reduced by one.

K. Appropriate galvanized blank covers, subject to approval of the Architect, shall be installed over outlet or junction boxes which do not house a device, and will only be permitted in mechanical/electrical/equipment spaces. Multiple devices shall be installed in one-piece multi-gang box with one-piece multi-gang cover plates. On surface mounted switch and receptacle outlets, provide raised covers to permit mounting devices without additional device plates.

L. For junction and pull boxes, use 14 gauge or thicker sheet metal. Attach covers by means of 1/4" X 20 round head machine screws. In damp locations, provide rubber or neoprene gaskets.

M. Attention is called to National Electrical Code, Article 314, Paragraph 314.16, Sub-paragraph (a) and (b) relative to allowable number of conductors in outlet boxes. Contractor shall make provisions to prevent overcrowding outlet and junction boxes regardless of number of conductors shown on the drawings at the outlets. There shall be no deviations from Code requirements on this subject.

5. CONDUCTORS

A. All conductors shall be copper and no wire shall be less than #12 AWG except as otherwise noted herein and or indicated on drawings. At Contractors option Aluminum conductors may be used for conductors larger than #2. Aluminum conductor sizes shall match the current carrying capacities of the copper conductors shown.

B. Minimum size conductors for branch circuits serving site lighting and power shall be #10 AWG.

C. All conductors, except as herein noted and/or as indicated on drawings, shall have 600-volt insulation type THHN/THWN. Wiring through channels of continuous surface or suspended fluorescent fixtures shall be Type RHH, or THHN.

D. Recessed fluorescent fixtures shall be fed with type THHN, or RHH conductors and recessed incandescent fixtures shall be fed with Type THHN conductors.

E. Conductors #8 and larger shall be stranded. Feeders shall be of the size and type indicated on drawings.

6. GROUNDING

A. Grounding shall conform to the requirements of Article 250 of the N.E.C.

B. Contractor shall provide grounding system indicated on drawings.

C. The steel conduit systems and the neutral conductors of the wiring systems shall be grounded at the service equipment. The copper service ground conductors shall be extended in conduit from the main switchboard the fire protection water and domestic water service entrance, each located in the sprinkler room. Ground connection shall be visible, and connection of conduit and conductors to the water pipe shall be made with an approved ground connector, conduit hub, and water pipe clamp.

D. A grounding conductor shall be provided in all conduit. The grounding conductor shall be green insulated, with a minimum size of #12 AWG, or as indicated on the drawings or per NEC-250. Grounding conductors routed entirely in soil as part of the ground loop shall be bare copper. The grounding electrode conductor connecting the electrical service to the ground system shall be bare copper.

E. The above requirements shall be supplemented by ground to 3/4" diameter, 10'-0" long driven copper bonded ground rods as shown on the drawings. For all underground connections, use exothermic welds.

F. Bond jumpers shall be used around concentric or eccentric knockouts on service equipment.

G. Grounding pole of each polarized receptacle shall be bonded to its outlet box with copper wire and machine or self-tapping screw.

7. EQUIPMENT SUPPORTS

All electrical switches, panels, appurtenances, etc., shall be rigidly supported on Kindorf, Unistrut, or equal steel framing which shall be securely fastened to walls, floors, ceilings, etc., as required. Details of framing must be submitted to Architect for approval before installation.

8. WIRING DEVICES

A. Devices shall be Specification Grade as manufactured by Leviton, Hubbell, P & S, or approved equal.

B. All devices listed below may not necessarily be used.

C. Comparative catalog numbers of devices shall conform to the following:

Duplex receptacle, 20A, 125V, NEMA 5-20
Hubbell CR5362
Leviton 5362
P & S 5362

Duplex receptacle, GFI, 20A, 125V, NEMA 5-20
Hubbell GF5362
Leviton 6899
P & S 2091

Simplex Receptacle, 30A, 125V, NEMA 5-30
Hubbell HBL 9308
Leviton 5371
P & S 3802

Toggle switch, 20A, 120-277V, SPST
Hubbel CS1221
Leviton 1221-2
P & S 20AC1

Toggle switch, 20A, 120-277V, DPST
Hubbell CS1222
Leviton 1222-2
P & S 20AC2

Toggle switch, 20A, 120-277V, 3-way
Hubbell CS1223
Leviton 1223-2
P & S 20AC3

Toggle switch, 20A, 120-277V, 4-way
Hubbell CS1224
Leviton 1224-2
P & S 20AC4

Toggle switch, 20A, 120-277V, pilot light
Hubbell HBL 1221 PL
Leviton 1221-7LI
P & S 20AC1-RPL

D. All receptacles shall be mounted with the grounding connection at the top. All receptacles shall be provided with child safety insulated inserts.

E. Occupancy Sensors shall be wall-mounted in standard 2-gang wall box. Unit shall be listed for 120-277 VAC operation with electronic ballasts, with a minimum load no more than 100 watts, and a maximum load no less than 600 watts as manufactured by Mytech. Sensor shall utilize dual technology sensing, using the following types of detection: Passive Infrared, or Ultrasonic (40 k Hz). Unit shall have an adjustable time delay with minimum range of 30 seconds to 20 minutes. All units shall be set at 5 minutes. Beam patterns must be minimum 170 degrees horizontal, and plus/minus 15 degrees vertical, with an overall coverage area no less than 900 square feet.

9. DEVICE PLATES

A. Wall plates shall be of the one-piece type, .100” smooth plastic of color as determined by Architect. Plates shall be of the same manufacturer as devices furnished.

B. Use Multi-gang plates where switches are grouped.

C. Plates shall be installed with all four edges in continuous contact with finished wall surfaces without the use of mats or similar devices. Plaster fillings will NOT be permitted. Plates shall be installed with an alignment tolerance of 1/16" from the vertical or horizontal. Plates for devices fed with exposed conduit shall be as hereinbefore specified.

D. Device plates shall not be installed until painting is completed. Device plates having paint on their surfaces, or having their finish marred by use of paint remover, shall be replaced at no additional cost to the Owner.

E. Where device is located outdoors or specified as weatherproof, use cast aluminum box with cast aluminum cover listed for wet location when cover is closed (NEC 406.8(b).

10. MOUNTING HEIGHTS

A. If not otherwise indicated in Architectural or Electrical drawings, mounting heights to centerline of outlets shall be as here-in-after listed.

B. Receptacles - 18" above finished floor except above counter where indicated, or as directed by Owner.

C. Light Switches - 48" above finished floor.

D. Panelboard - Not more than 6'-0" from topmost operating handle to floor.

E. Bracket Fixtures – as shown on the drawings, or where mounted above exterior door, mirror, medicine cabinet, at a height just sufficient to clear the swing of the door or medicine cabinet.

F. The above mounting heights may be adjusted as required to permit bottom or top of plate to align with mortar joints in unfinished masonry walls, provided joints are not raked. Where joints are raked, adjust height as required to insure that center of outlet box will be in center of a masonry unit.

11. PANELBOARDS

A. Panelboards shall be constructed with copper or silver-plated copper bus bars. Panelboard shall be fully rated (no series rating allowed) with a minimum rating for each panelboard as indicated on panel schedules on the drawings.

B. See drawings for panelboard schedules. All panels shall have ground bus.

C. Panelboards shall be mounted in suitable electro-galvanized or sherardized, code-gauge, dead front, steel boxes with trim arranged for flush or surface mounting as indicated on drawings. Sufficient space shall be provided for not less than 4" gutters on the sides, top and bottom of panels. The doors shall be fitted with not less than two welded and riveted hinges, fitted with non-removal pins and provided with latches and locks with three (3) keys. Door and trim shall be properly matched and fitted closely by means of welded rebar on the sides of the trim and shall be finished to match surrounding walls or as

otherwise directed by the Architect. Directory frame with typewritten directory of circuits under transparent cover shall be provided inside of door.

D. Panelboards shall be so located that its rating will not be reduced by heat from external sources.

E. Circuit breakers shall be bolted to the bus bar, and be quick-make, quick-break, using over-center toggle mechanism. Breakers shall indicate tripped position by assuming the center toggle position. Breakers shall have deion arc extinguisher principle. All two and three-pole breakers shall have single handle and the common trip. Provide breaker handle ties for all individual single pole circuits that share common ungrounded conductors as per NFPA 70. At contractors option two and/or three pole breakers may be used in lieu of the breaker ties. Breaker ties shall not be allowed for multi pole circuits. Breakers shall have the same or higher AIC rating as the Panel in which they are installed.

F. Panelboards shall be as shown in panelboard schedule and shall be equal to those manufactured by Cutler-Hammer, General Electric, Siemens, or Square D.

12. SAFETY SWITCHES

A. Safety switches shall be of the visible blade, heavy-duty knife switch type. They shall be of the fused or unfused type as required. Fused switches shall have positive pressure fuse clips. Switches shall be fully interlocked with provision to neutralize the interlock by a screwdriver while under load without interrupting the circuit. Switches shall be complete with insulated base and pressure or solderless lugs. All switches shall be horsepower rated, capable of breaking stalled-rotor motor current at these ratings. Outdoor locations shall have NEMA Type 3R enclosures; indoor locations shall have NEMA 1 enclosures.

B. Switches shall have provision for padlocking in the "ON" or "OFF" positions. Safety switches, as indicated on plans, shall be Siemens, Cutler Hammer or Square D.

13. FUSES

Fuses utilized shall provide type 2 "no damage" as defined by IEC 947. All fuses shall have a minimum interrupting rating of 200,000 A. Fuses protecting transformers shall be Class J or RK5 time delay. Fuses protecting motor loads shall

be Class J or RK1 current limiting. Fuses shall be manufactured by Ferraz-Shawmut, Cooper Bussman, or approved equal.

14. SWITCHBOARDS

A. Switchboard shall be 480/277volt, 3 phase, 4 wire, dead-front, metal enclosed, free-standing, front accessible structure with protective devices as shown on the drawings. Switchboard shall be suitable for use as service entrance equipment. Switchboard shall have copper bussing of sufficient cross sectional area to continuously conduct rated full load current without exceeding the maximum temperature rise limits set by UL #891, and shall have AIC ratings as shown on the plans. Ventilation openings shall be provided where required. Temperature rise not to exceed 55 degrees C. All switchboard section busses shall be fully rated, with no tapering, and shall have a 100% rated neutral bus. Ground fault protection shall be provided on main of the 480-volt switchboard as shown on the drawings, utilizing return path sensors. A ground bus shall be provided to extend the entire length of the switchboard. Provide separate barrier section for fire pump feeders. Main breaker shall be 100% rated electronic trip type.

B. Each switchboard shall be provided with a check meter which will indicate phase currents, avg. phase current, ampere demand, phase voltages, avg. phase voltage, line voltages, avg. line voltage, Kilowatts, KVA, KVAR, KW demand, KW hours, KVAR hours, power factor, frequency (Siemens 9350 power meter or approved equal).

C. All switchboard breakers shall be electronic trip type, full function with zone selective interlocking. Manufacturer shall perform coordination study and adjust breaker settings accordingly. See Section 16010 – Commissioning.

D. Switchboards shall be manufactured by Siemens, Cutler-Hammer, Square D, GE, or approved equal.

E. A factory representative shall torque all breakers and bus bars to factory tolerances prior to startup of electrical system

15. TRANSFORMERS

Transformers shall be low loss type with minimum efficiency per NEMA TP-1.
Transformers shall be three phase with 480 volt primaries and 208V/120 volts secondaries. Transformers shall be indoor, floor mounted, dry type with 2 – 2-1/2" FCAN and FCBN taps. Transformers shall be designed for 150 degrees C. temperature rise, UL approved, and shall meet ASA-NEMA sound level standards for the KVA size indicated on the drawings. Transformers shall be provided with a normal K factor, unless noted otherwise on the drawings. Provide 4 inch

housekeeping concrete pad under each transformer. Transformers shall be as manufactured by Cutler-Hammer or Square D.

16. TERMINATIONS

All termination lugs shall be rated 75 degrees C or higher, and shall be compatible with number and size of wires to be terminated.

END OF SECTION

SECTION 16400 - ELECTRICAL SERVICES

PART 1 - GENERAL

1. GENERAL REQUIREMENTS

A. Applicable items of all other ELECTRICAL SECTIONS shall apply to this Section.

2. ELECTRICAL POWER SERVICE

A. This Contractor shall make arrangement with Entergy Corporation so that the Contractor may provide the required service and shall pay all fees and assessments.

B. All arrangements of service installation shall comply with requirements of the contract documents and approval of Entergy Corporation. Contractor shall coordinate with Entergy Corporation for the provision of all raceways, and points of termination as shown on the contract documents prior to installation. Any conflict shall be brought to the attention of the Architect immediately.

C. Contractor shall contact Entergy Corporation for inspection of all underground work and grounding prior to backfill. Contact Entergy Corporation for inspection of transformer foundation, prior to pouring concrete.

D. Underground conduits, for conductors installed by Entergy Corporation, shall be Schedule 80 PVC and installation shall conform to all requirements of the Entergy Corporation.

3. TELEPHONE SERVICE

A. Contractor shall coordinate with the Telephone Service Provider for the provision of all raceways, pull boxes, and points of termination as shown on the contract documents prior to installation. Any conflict shall be brought to the attention of the Architect and Consulting Engineer immediately.

B. Contractor shall coordinate with the Telephone Service Provider for the allocation of backboard space and grounding provisions

PART 2 - EXECUTION

4. TEMPORARY POWER AND LIGHTING

The Contractor shall make all necessary arrangements with Entergy Corporation for furnishing a temporary power supply with service as required by the General

Contractor and various Sub-contractors employed in connection with the work to be performed on the job site. The Contractor shall cooperate with other Sub-contractors to insure that adequate power and lighting service is available at all times during the progress of the work.

END OF SECTION

SECTION 16500 - LIGHTING FIXTURES

PART 1 - GENERAL

1 RELATED DOCUMENTS

A. All Drawings and General Provisions of the Contract, including General Conditions, Supplementary Conditions, and other Division 1 Specification Sections apply to this Section.

B. Applicable items in all other Electrical Sections shall be included in this Section.

PART 2 – PRODUCTS

2. LIGHTING FIXTURES

A. Contractor shall furnish and install all lighting fixtures as shown in fixture schedule and at locations indicated on drawings. This includes all fixtures with lamps, necessary supports, etc., for a complete and safe installation, along with wiring and connections thereto.

B. Ballasts for operation of all fluorescent lamps shall be HPF Electronic with Class A Sound Rating.

C. Fluorescent ballasts for operation of F32 T8 rapid start lamps shall be electronic high-efficiency type.

3. LAMPS AND BALLASTS

A. Lamps shall operate in instant start mode.

B. Multiple lamps shall operate as parallel circuit. Remaining lamps shall operate at full light output upon failure of other lamps connected to the same ballast.

C. Individual ballasts specifically designed and UL Listed shall operate one, two, three, or four lamps as scheduled on the drawings.

D. Lamps shall operate at a frequency higher than 20 kHz.

E. Lamps and ballasts shall operate a rated circuit voltage (120 or 277 VAC) at an input frequency of 60 Hz, and tolerate +/- 10% sustained voltage variation without damage to the ballast, and maintain light output at +/- 10% voltage variation.

F. Lamps and ballasts shall comply with EMI and RFI limits set by the FCC (CRF 47 Part 18) for non-consumer applications and not interfere with normal electrical equipment.

G. Power Factor shall be not less than 0.95.

H. Total Harmonic Distortion shall be less than 10%.

I. Lamp Crest Factor shall be 1.7 or less.

J. Ballast Factor shall be greater than 0.85.

K. Sound rating shall be “A”.

L. Withstand transients shall be as specified by ANSI C.62.41 for location category A.

M. Shall comply with applicable ANSI standards.

N. Shall be provided with a three (3) year warranty.

O. All incandescent lamps shall be furnished with inside frosting except where specifically noted otherwise.

P. T8 fluorescent lamps shall be four (4’) feet long, bi-pin, rapid start, 3500 K, 85 CRI, except where specifically noted otherwise.

Q. All H.I.D. lamps shall be phosphor coated, wattage as specified in the drawings.

4. MANUFACTURERS

A. Certain items in this Specification are listed by manufacturer and/or manufacturer's model number to establish general style, type, character, and quality of product desired. Similar items manufactured by other than those listed will be considered, providing submittals are made according to Pre-Bid Approval requirements. Where fixture description provided is in conflict with the model number provided, contractor shall provide a light fixture meeting the description, not the model number.

B. See Lighting Fixture Schedule on Drawings.

PART 3 - EXECUTION

5. INSTALLATION

A. All recessed fixtures installed in plaster ceilings shall be furnished with metal plaster frames.

B. Electrical Contractor shall advise General Contractor as to the exact location of all recessed fixtures so that ceiling construction and/or joist spacing may be coordinated as necessary to permit symmetrical positioning of fixture in each room.

C. In acoustical tile ceilings, recessed fluorescent fixtures shall be installed so as to alleviate the necessity for cutting the tile.

D. Trims of all recessed fixtures shall be installed in a neat and workmanlike manner so as to fit tightly and evenly against the surface of the ceiling. Adapters shall be installed to compensate for slope ceilings.

E. For acoustical tile ceilings, surface fixtures shall be centered on a tile or a tile joint, unless noted otherwise.

F. Fixtures to be installed in or on painted ceilings and/or walls shall not be installed until painting is completed. Fixtures installed with paint applied over factory finishes will be rejected.

G. For any type ceiling which itself does not provide sufficient support for fixtures, support fixtures from structure above. Lay-in troffers in grid type ceilings shall be installed with at least 2 supports on diagonal corners.

H. Where they are indicated, exit fixtures shall have LED lamps and shall have letters at least five (5") inches high on a metal stencil with a red translucent background. Exit fixtures shall be wall mounted (unless ceiling mounted is required for the particular location) above doors as shown on drawings, and shall be mounted such that viewing angles are maximized.

END OF SECTION

SECTION 16600 - PUBLIC ADDRESS AND MUSIC SYSTEM

PART 1 - GENERAL

1 DESCRIPTION

A. This section of the specification includes the furnishing, installation, connection and testing of the public address system equipment required to form a complete, operative, coordinated system. It shall include, but not be limited to, amplifiers, speakers, microphones, and wiring as shown on the drawings and specified herein.

B. The system and peripheral devices shall be manufactured 100% by a single U.S. manufacturer (or division thereof).

C. The installing Contractor shall employ technicians on site to guide the final check-out and to ensure the systems integrity. The installing Contractor shall be licensed by the State of Louisiana.

2 SUBMITTALS

A. General:

1. Two copies of all submittals shall be submitted to the Architect for review.
2. All references to manufacturer's model numbers and other pertinent information herein is intended to establish minimum standards of performance, function and quality. Equivalent compatible UL-listed equipment from other manufacturers may be substituted for the specified equipment as long as the minimum standards are met.
3. For equipment other than that specified, the contractor shall supply proof that such substitute equipment equals or exceeds the features, functions, performance, and quality of the specified equipment.

B. Shop Drawings:

1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
2. Include manufacturer's name(s), model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts.
3. Show layout, configurations, and terminations.

C. Manuals:

1. Submit simultaneously with the shop drawings, complete operating and maintenance manuals listing the manufacturer's name(s), including technical data sheets.
2. Wiring diagrams shall indicate internal wiring for each device and the interconnections between the items of equipment.
3. Provide a clear and concise description of operation that gives, in detail, the information required to properly operate the equipment and system.

3. GUARANTY

All work performed and all material and equipment furnished under this contract shall be free from defects and shall remain so for a period of at least one (1) year from the date of acceptance. The full cost of maintenance, labor and materials required to correct any defect during this one year period shall

be included in the submittal bid.

PART 2 - PRODUCTS

4. AMPLIFIER

A. The amplifier shall be a model Bogen Communications Model G250 with Bogen Model PCM2000 Zone Paging Module, or approved equal, rated at 250 watts RMS.

B. The amplifier shall accommodate up to 6 Lo-Z balanced microphones, 1Hi-Z auxiliary sources and a telephone paging input (Mic 5 shall be switch-selected for mic or telephone line; Mic 6 switch-selected for microphone or Aux 1). Mics 1 through 4 shall use XLR-type connectors; Aux input shall be via RCA phono jacks and all other connectors shall use screw terminals. Phantom power shall be supplied for use with condenser microphones. Microphone precedence connections shall be included for Mic 1, 2, 3, 5/Tel, 6/Aux 1 and Aux 2.

C. Zone Paging System shall be able to simultaneous high-power and low power paging from one to 99 zones, up to 32 paging zone groups, universal telephone interface designated for direct connection to loop start and ground start trunks, to PBX or Key paging ports witch supply DTMF capability, and analog T/R lines.

Emergency ALL- Facility Override Paging, Background music assigned per zone.

D. The amplifier shall provide a frequency response from 20 Hz to 20 kHz +0/-1 dB at rated power. Distortion shall be 0.3% typically, from 20 Hz to 20 kHz direct at rated power and from 65 Hz to 20 kHz transformer @ -2 dB.

E. The amplifier shall include an Aphex Aural Exciter circuit, variable loudness contour control, and dual function equalizer. The equalizer shall be switch selectable for feedback control or acoustic shaping and shall include 10 center-detent slide controls providing ±12 dB of boost or cut from 62.5 Hz to 16 kHz in acoustic mode and from 125 Hz to 8 kHz in feedback control mode.

F. The amplifier shall include automatic level control to provide consistent output regardless of whom is paging, automatic muting complete with a VOX circuit, and a variable mute level. Provisions shall also be included for remote volume control, using an accessory control unit (GSRVC).

G. Outputs shall be provided for 4- and 8-ohm speakers and for 25V, 25VCT, and 70V distributed systems. Additional outputs shall be provided to feed a booster amp and tape recorder. A dedicated output shall permit feeding a 600-ohm telephone line using an accessory transformer (Model WMT1A). A Preamp out/power amp in circuit shall be provided to insert signal processing equipment.

H. The amplifier shall be rack mountable using an accessory rack panel kit (GSRPK). It shall be UL and CSA listed and shall be backed by a 3-year warranty.

5. AUXILIARY SOURCE CD PLAYER

A. The auxiliary program source shall be a Bogen Model CDR1, or approved equal, CD Player with AM/FM Receiver.

B. The program source shall include manual tuning and auto seeks control. The auto seek control shall automatically ascend (or descend) the frequency scale to the next strong frequency. It shall be possible to program up to 5 bands (FM1, FM2, FM3, AM1, AM2) with up to 6 stations each for a total of 30 stations. A preset scan control shall be provided to scroll and select from available presets. The FM section shall have a frequency range from 87.5 MHz - 108 MHz; the AM section will have a frequency range of 520 kHz - 1620 kHz. Pluggable screw terminal inputs shall be available for an AM

loop antenna, a FM dipole antenna, and for speaker outputs. An F-type coax antenna connector shall also be available.

C. The CD player system shall include Browse, Repeat, Random Play, and Pause functions. The CD player shall be capable of playing CD, CD-R, or CD-RW discs.

D. The CDR1 shall have a frequency response of 20 Hz - 20 kHz (< 5 dB).

E. The following controls shall be provided: Power/Volume, Disc Eject, Mode (Radio, CD, AUX), Audio/Menu Select (Volume, Bass, Treble, Balance, Display, Seek, and Clock), Mute, Scan, Stereo/Mono, Station Store/Select, Loudness Contour, Band, and Station Select. An LCD digital readout shall be provided to show selected frequency and band (in Radio Mode) or track (in CD Mode) information.

F. The unit shall operate on 12V DC (3A) power with an included desktop-style AC power adapter. It shall be possible to drive 8-ohm loudspeakers directly from 1W per channel (Right/Left) outputs. A 50-ohm mono-summed RCA output shall also be available, in addition to stereo.

G. The unit shall be 7-1/4" W x 2-1/8" H x 9-1/4" D and shall weigh 4 lb. The unit shall mount in a standard 19-inch rack system (2 rack spaces high) with the RK78 rack mounting kit (sold separately).

6. MICROPHONE

The microphone shall be a Bogen Model HDU150. It shall be cardioids, dynamic handheld microphone with a frequency response of 70 Hz to 15 kHz and a 500-ohm impedance. The sensitivity shall be -70 dB (+/- 3dB) and the signal-to-noise ratio greater than 65 dB. It shall have a sliding-type on/off switch and a rubberized black finish. The HDU150 shall have an XLR Male connector. Dimensions shall be 6-1/2" D x 1-1/2" Dia. Weight shall be 1 lb.

7. SPEAKERS

A. The loudspeaker shall be a Bogen Model CSD 1x2 White, or approved equal.

B. The loudspeaker shall have a 8”dual cone speaker with a 10-ounce magnet and tweeter.5-watt 25/75 transformer with 5,2,1,1/2, & ¼ W taps setting: selectable by rotary switch.

C. Dimensions of each speaker shall be 12-7/8”W X 23-3/4”L x 4-3/4”D.

8. CONDUIT AND WIRE:

A. Conduit:

1. Conduit shall be in accordance with The National Electrical Code (NEC), local and state requirements.
2. All wiring shall be installed in conduit or raceway. Conduit fill shall not exceed 40 percent of interior cross sectional area where three or more cables are contained within a single conduit.
3. Cable must be separated from any open conductors of power, or Class 1 circuits, and shall not be placed in any conduit, junction box or raceway containing these conductors, per NEC Article 760-55.
4. Conduit shall be 1/2-inch minimum.

B. Wire:

1. All sound system wiring shall be new, and shall be installed in conduits.
2. Wiring shall be in accordance with local, state and national codes and as recommended by the manufacturer of the sound system. Number and size of conductors shall be as recommended by the system manufacturer.
3. Wire and cable shall be installed in conduit and shall have a fire resistance rating suitable for the installation.

C. Terminal Boxes, Junction Boxes and Cabinets:
   1. All boxes and cabinets shall be UL listed for their use and purpose.

PART 3.0 - EXECUTION

9. INSTALLATION:

A. Installation shall be in accordance with local and state codes, as shown on the drawings, and as recommended by the major equipment manufacturer.

B. All conduit, junction boxes, conduit supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas.

C. All system devices, control panels and microphone shall be flush mounted when located in finished areas and may be surface mounted where located on the drawings.

10. TEST:

A. The service of a competent, factory-trained engineer or technician authorized by the manufacturer of the equipment shall be provided to technically supervise and participate during all of the adjustments and tests for the system.

B. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.

11. FINAL INSPECTION:

At the final inspection, a factory trained technician shall demonstrate that the system functions properly in every respect.

12. INSTRUCTION:

A. Instruction shall be provided as required for operating the system. Hands-on demonstrations of the operation of all system components and the entire system including program changes and functions shall be provided.

B. The contractor or installing dealer shall provide a user manual indicating "Sequence of Operation."

END OF SECTION

SECTION 16760 - FIRE DETECTION AND ALARM SYSTEM

PART 1 – GENERAL

1. SUMMARY

A. This Section covers the renovations to the existing fire alarm systems, including initiating devices, notification appliances, controls, and supervisory devices.

B. Work covered by this section includes the furnishing of labor, equipment, and materials for the removal of existing devices and the installation of new fire alarm system as indicated on the drawings and specifications.

C. The Fire Detection and Alarm System shall consist of all necessary hardware equipment and software programming to perform the following functions:

1. Fire alarm and detection operations
2. Control and monitoring of elevators, smoke control equipment, door hold-open devices, fire suppression systems, emergency power systems, and other equipment as indicated in the drawings and specifications.
3. Interconnection with existing Erato Street wharf to annunciate the occurrence of an incidence and the receipt of notification of an incident at the Erato Street wharf. Provide surge suppression devices on each of the interconnection circuits.

D. The existing equipment, additions and service described in this specification are those supplied and supported by Simple/Grinnell and Notifier represent the approver manufacturers for the Fire Alarm System. Being listed as an approver manufacturer in no way relieves the obligation to provide all equipment and features in accordance with the requirements of these specifications.

2. RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

B. The work covered by this section is to be coordinated with related work as specified elsewhere in the specifications. Requirements of the following sections apply:

1. Section 16010 - Electrical General
2. Section 16050 - Electrical Materials and Methods
3. Section 15500 - Fire Suppression
4. Section 15800 - Heating, Ventilating, and Air Conditioning

C. The system and all associated operations shall be in accordance with the following:

1. Guidelines of the IBC
2. NFPA 72, National Fire Alarm Code
3. NFPA 70, National Electrical Code
4. NFPA 101, Life Safety Code
5. NFPA 90A, Standard for the Installation of Air Conditioning and Ventilating Systems
6. Other applicable NFPA standards
7. Local Jurisdictional Adopted Codes and Standards
8. ADA Accessibility Guidelines

3. SYSTEM DESCRIPTION

A. General: Relocate, replace and add devices as shown on the drawings, to provide a complete, non-coded, addressable, microprocessor-based fire alarm system with voice evacuation speakers, initiating devices, notification appliances, and monitoring and control devices as indicated on the drawings and as specified herein.

B. Software: The existing fire alarm system allows for loading and editing instructions and operating sequences as necessary. The system is capable of 100% on-site programming to accommodate system expansion and facilitate changes in operation. All programming shall be capable of being accomplished via the front panel and via a lap top computer. All software operations shall be stored in a non-volatile programmable memory within the FACP. Loss of primary and secondary power shall not erase the instructions stored in memory.

C. History Logs: The system shall provide a means to recall alarms and trouble conditions in chronological order for the purpose of recreating an event history. Separate alarm, supervisory and trouble logs shall be provided.

D. Recording of Events: Record all alarm, supervisory, and trouble events by means of system printer. The printout shall include the type of signal (alarm, supervisory, or trouble) the device identification, date and time of the occurrence. The printout differentiates alarm signals from all other printed indications.

E. Wiring/Signal Transmission:

1. Transmission shall be addressable signal transmission, dedicated to fire alarm service only.
2. System connections for initiating (signaling) circuits and notification

appliance circuits shall be Class B.

3. Circuit Supervision: Circuit faults shall be indicated by a trouble signal at the FACP. Provide a distinctive indicating audible tone and alphanumeric annunciation.

4. SUBMITTALS

A. Submit the following according to Conditions of Contract and Division 1 Specification Sections.

1. Product data sheets for system components highlighted to indicate the specific products, features, or functions required to meet this specification. Alternate or as-equal products submitted under this contract must provide a detailed line-by-line comparison of how the submitted product meets, exceeds, or does not comply with this specification.
2. Wiring diagrams from manufacturer.
3. Shop drawings showing system details including location of FACP, all devices, circuiting and annunciator.
4. System Power and battery charts with performance graphs and voltage drop calculations to assure that the system will operate per the prescribed backup time periods and under all voltage conditions per all applicable standards.
5. System operation description including method of operation and supervision of each type of circuit and sequence of operations for all manually and automatically initiated system inputs and outputs. A list of all input and output points in the system shall be provided with a label indicating location or use of SLC, NAC, RAC, Sensor, and auxiliary control circuits.
6. Operation and maintenance data for inclusion in Operating and Maintenance Manual. Include data for each type product, including all features and operating sequences, both automatic and manual. Provide the names, addresses, and telephone numbers of service organizations.
7. Product certification signed by the manufacturer of the fire alarm system components certifying that their products comply with indicated requirements.
8. Record of field tests of system.

B. In addition to routine submission of the above material, make an identical submission to the State Fire Marshall. Include copies of shop drawings as required to depict component locations to facilitate review. Upon receipt of comments from the Authority, make resubmissions if required to make clarifications or revisions to obtain approval. Contractor shall provide all documents required by the State Fire Marshal to review. Documents shall include all calculations and data necessary. These documents shall be sent to the Architect for his forwarding to the State Fire Marshal. This Contractor shall pay all fees associated with the Fire Marshal submittal. No work shall be done until the submittal is approved and returned from the Fire Marshal.

5. QUALITY ASSURANCE

A. A factory authorized installer is to perform the work of this section.

B. Each and all items of the Fire Alarm System shall be listed as a product of a single fire alarm system manufacturer under the appropriate category by Underwriters Laboratories, Inc. (UL), and shall bear the "UL" label.

6. EXTRA MATERIALS

A. Furnish extra materials, packaged with protective covering for storage, and identified with labels clearly describing contents as follows:

1. Break Rods for Manual Stations: Furnish quantity equal to 15 percent of the number of manual stations installed; minimum of 6 rods.
2. Strobe Units: Furnish quantity equal to 10 percent of the number of units installed, but not less than one.
3. Smoke Sensors, Fire Detectors, and Flame Detectors: Furnish quantity equal to 10 percent of the number of units of each type installed but not less than one of each type.
4. Sensor Bases: Furnish quantity equal to 2 percent of the number of units of each type installed but not less than one of each type.

PART 2 - PRODUCTS

7. FIRE ALARM CONTROL PANEL (FACP)

A. General: Comply with UL 864, "Control Panels for Fire-Protective Signaling Systems."

B. The existing FACP and hardware are as manufactured by Simple/Grinnell. FACP model NFS-320 as manufactured by Notifier is an approved equal. All the new devices shall be compatible to existing when installed.

C. As part of this contract the existing FACP in both the Julia Street Wharf and Erato Street Wharf shall be interconnected such that if an incident occurs in either building the other building shall receive notification. Provide surge suppression devices in all Fire Alarm circuits the leave the Julia Street Wharf.

8. EMERGENCY POWER SUPPLY

The components include battery, charger, and an automatic transfer switch are existing and shall remain.

9. STANDARD ALARM NOTIFICATION APPLIANCES

A. Horn: Piezoelectric type horn shall be listed to UL 464. The horn shall have a minimum sound pressure level of 85 dBA @ 24VDC. The horn shall mount directly to a standard single gang, double gang or 4" square electrical box, without the use of special adapter or trim rings.

B. Visible/Only: Strobe shall be listed to UL 1971. The V/O shall consist of a xenon flash tube and associated lens/reflector system. The V/O enclosure shall mount directly to standard single gang, double gang or 4" square electrical box, without the use of special adapters or trim rings. V/O appliances shall be provided with different minimum flash intensities of 15cd, 75cd and 110cd. Provide a label inside the strobe lens to indicate the listed candela rating of the specific Visible/Only appliance.

C. Audible/Visible: Combination Audible/Visible (A/V) Notification Appliances shall be listed to UL 1971 and UL 464. The strobe light shall consist of a xenon flash tube and associated lens/reflector system. Provide a label inside the strobe lens to indicate the listed candela rating of the specific strobe. The horn shall have a minimum sound pressure level of 85 dBA @ 24VDC. The audible/visible enclosure shall mount directly to standard single gang, double gang or 4" square electrical box, without the use of special adapters or trim rings.

D. Notification Appliance Circuit shall provide synchronization of strobes at a rate of 1Hz and operates horns with a Temporal Code Pattern cadence operation. The circuit shall provide the capability to silence the audible signals, while the strobes continue to flash, over a single pair of wires. The capability to synchronize multiple notification appliance circuits shall be provided.

E. Speakers: All speakers shall operate on 25 VRMS or with field selectable output taps from 0.5 to 2.0 Watts. Speakers in corridors and public spaces shall produce a nominal sound output of 84 dBA at 10 feet (3m). Frequency response shall be a minimum of 400 HZ to 4000 HZ. The back of each speaker shall be sealed to protect the speaker cone from damage and dust.

F. Door hold open device shall be semi flush,120v, Electromagnetic type with 2” single gang back box., Simplex Model 20088-9608, or approved equal. Control connection to Fire Alarm system shall be under the Fire Alarm section.

G. Accessories: The contractor shall furnish all the necessary accessories required for a complete and operational installation.

H. Approved alternate manufacturer shall be Notifier, model FDU-80 for Annunciator and model VEC 25/50 for Voice Evac Panel.

10. NAC POWER EXTENDER

Provide a new IDNet NAC Power Extender panel as necessary to accommodate any new device quantities.

PART 3 - EXECUTION

11. INSTALLATION, GENERAL

A. Install system components and all associated devices in accordance with applicable NFPA Standards and manufacturer's recommendations.

B. Installation personnel shall be supervised by persons who are qualified and experienced in the installation, inspection, and testing of fire alarm systems. Examples of qualified personnel shall include, but not be limited to, the following:

1. Factory trained and certified personnel.
2. National Institute of Certification in Engineering Technologies (NICET) fire alarm level II certified personnel.
3. Personnel licensed or certified by state or local authority.

12. EQUIPMENT INSTALLATION

A. Furnish and install a complete Fire Alarm System as described herein and as shown on the plans. Include sufficient control units, annunciators, manual stations, automatic fire detectors, smoke detectors, audible and visible notification appliances, wiring, terminations, electrical boxes, and all other necessary material for a complete operating system.

B. The Fire Alarm Equipment shall be maintained fully operational until the equipment has been tested and accepted.

C. Water-Flow and Valve Supervisory Switches: Connect for each sprinkler valve that is required to be supervised.

D. Device Location-Indicating Lights: Locate in the public space immediately adjacent to the device they monitor.

13. WIRING INSTALLATION

A. System Wiring: Wire and cable shall be a type listed for its intended use by an approval agency acceptable to the Authority Having Jurisdiction (AH and shall be installed in accordance with the appropriate articles from the current

approved edition of NFPA 70: National Electric Code (NEC).

B. Contractor shall obtain from the Fire Alarm System Manufacturer written instruction regarding the appropriate wire/cable to be used for this installation. No deviation from the written instruction shall be made by the Contractor without the prior written approval of the Fire Alarm System Manufacturer.

C. Color Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use red color code for alarm initiating device circuits wiring and notification circuits. Gauge of wire shall be used to decipher the difference between initiating and notification. Paint fire alarm system junction boxes and covers red.

14. FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Provide services of a factory-authorized service representative to supervise the field assembly and connection of components and the pretesting, testing, and adjustment of the system.

B. Service personnel shall be qualified and experienced in the inspection, testing, and maintenance of fire alarm systems.

C. Determine, through pretesting, the conformance of the system to the requirements of the Drawings and Specifications. Correct deficiencies observed in pretesting. Replace malfunctioning or damaged items with new and retest until satisfactory performance and conditions are achieved.

D. Final Test Notice: Provide a 10-day minimum notice in writing when the system is ready for final acceptance testing.

E. Minimum System Tests: Test the system according to the procedures outlined in NFPA 72.

F. Retesting: Correct deficiencies indicated by tests and completely retest work affected by such deficiencies. Verify by the system test that the total system meets the Specifications and complies with applicable Codes and Standards.

G. Report of Tests and Inspections: Provide a written record of inspections, tests, and detailed test results in the form of a test log.

H. Final Test, Certificate of Completion, and Certificate of Occupancy: Test the system as required by the Authority Having Jurisdiction in order to obtain a certificate of occupancy.

15. CLEANING AND ADJUSTING

A. Cleaning: Remove paint splatters and other spots, dirt, and debris from all fire alarm devices. Clean units internally, as required, using methods and materials recommended by manufacturer.

B. Occupancy Adjustments: When requested, within one year of date of Substantial Completion, provide on-site assistance in adjusting sound levels and adjusting controls and sensitivities to suit actual occupied conditions. Include in bid up to three visits to the site for this purpose.

16. TRAINING

A. Provide the services of a factory-authorized service representative to demonstrate the system and train Owner's maintenance personnel as specified below.

1. Train Owner's maintenance personnel in the procedures and schedules involved in operating, troubleshooting, servicing, and preventive maintaining of the system. Provide a minimum of 8 hours of training.
2. Schedule training with the Owner at least seven days in advance.

END OF SECTION

SECTION 16840 – TELECOMMUNICATIONS DISTRIBUTION SYSTEMS

PART 1 – GENERAL

1. RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specifications Sections, apply to this Section.

2. SCOPE

This Section includes wire, cable, connecting devices, installation, and testing for wiring systems to be used as signal pathways for voice and high-speed data transmission.

3. DEFINITIONS

A. EMI: Electromagnetic Interference.

B. IDC: Insulation Displacement Connector.

C. LAN: Local Area Network.

D. PVC: Poly Vinyl Chloride.

E. UTP: Unshielded Twisted Pair.

4. SUBMITTALS

A. Product Data: Includes data on features, ratings and performance for each component specified.

B. Shop Drawings: Includes dimensioned plans and elevation views of each individual component. Show equipment assemblies, method of field assembly, workspace requirements, and access for cable connections.

1. System labeling schedules, including electronic copy of labeling schedules, as specified in Part 3, in software and format selected by Owner.

2. Wiring diagrams. Show typical wiring schematics including the following:

a. Workstation outlets, jacks, and jack assemblies.

b. Patch panels.

C. Cable Administration Drawings: As specified in Part 3.

D. Samples: For workstation outlets, jacks, jack assemblies, and faceplates for color selection and evaluation of technical features.

E. Product Certificates: For each type of cable, connector, and terminal equipment, signed by product manufacturer.

F. Qualification Data: For Installer.

G. Field quality-control test reports.

H. Operation and Maintenance Data: For voice and data communication cabling to include in emergency, operation, and maintenance manuals.

5. QUALITY ASSURANCE

A. Installer Qualifications: System installer must have on staff a registered communication distribution designer with current certification by Building Industry Consulting Service International.

B. Testing Agency Qualifications: An independent testing agency, with the experience and capability to conduct the testing indicated, that is a member company of the International Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the International Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

C. Source Limitations: Obtain all products except twisted-pair cables through one source from a single manufacturer.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by "UL", and marked for intended use.

E. Comply with NFPA 70.

6. EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Cable: 250 feet of each size and type used for Project. Furnish on reels.

2. Patch-Panel Units: One of each type for every six installed, but no fewer than one.

3. Connecting Blocks: One of each type for every 25 installed, but no fewer than one.

4. Outlet Assemblies: One of each type for every 25 installed, but no fewer than one.

PART 2 – PRODUCTS

7. MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cable:

a. Belden Inc.: Electronics Division.

b. Berk-Tek; an Alcatel Company.

c. General Cable Corporation.

d. Lucent Technologies; Global Service Provider.

e. Mohawk/CDT; a division of Cable Design Technologies.

f. Optical Cable Corporation.

g. Panduit Corp.

h. Siecor.

i. Superior Essex; Superior Telecommunications Inc.

2. Terminal and Connector Components and Distribution Racks:

a. AMP Incorporated; a Tyco International Ltd. Company.

b. Hubbell Premise Wiring.

c. Leviton Telecom.

d. Lucent Technologies; Global Service Provider.

e. Panduit Corp.

f. Thomas & Betts Corporation.

8. SYSTEM REQUIREMENTS

A. General: Coordinate the features of materials and equipment so they form an integrated system. Match components and interconnections for optimum future performance.

B. Expansion Capability: Unless otherwise indicated, provide spare, positions in cross-connect and patch panels, and terminal strips to accommodate 20 percent future increase inactive workstations.

9. MOUNTNG ELEMENTS

A. Raceways and Boxes: Comply with Section 16130, " Raceways and Boxes."

B. Backboards: ¾-inch, interior-grade, fire-retardant-treated plywood.

10. TWISTED-PAIR CABLES, CONNECTORS, AND TERMINAL EQUIPMENT

A. Cables: Listed as complying with Category 5E for voice and category 6 for data of TIA/EIA-568-A.

B. Conductors: Solid copper.

C. UTP Cable: Comply with TIA/EIA-568-A. Four, thermoplastic-insulated, individually twisted pairs of conductors; No. 24 AWG, color coded; enclosed in PVC jacket.

D. UTP Cable Connecting Hardware: Comply with TIA/EIA-568-A. IDC type, using modules designed for punch-down caps or tools.

1. IDC Terminal Block Modules: Integral with connector bodies, including plugs and jacks where indicated.

E. Cross-Connect Panel: Modular array of IDC terminal blocks arranged to terminate building cables and permit interconnection between cables.

1. Number of Terminals per Field: One for each conductor in assigned cables.

2. Mounting: Wall mount

F. Patch Panel: Modular panels housing multiple-numbered jack units with IDC-type connectors at each jack for permanent termination of pair groups of installed cables.

1. Mounting, Hinged, wall mount

G. Jacks and Jack Assemblies for UTP Cable: Modular, color coded, RJ-45 receptacle units with integral IDC-type terminals, Use keyed jacks for data service.

H. Workstation Outlets: Dual jack-connector assemblies mounted in single or multigang faceplate.

1. Faceplate: High-impact plastic: color as selected by Architect.

2. Mounting: Flush, unless otherwise indicated.

3. Legend: Factory labeled, top jack “Voice” and bottom jack “Data,” by silk-screening or engraving.

11. INDENTIFICATION PRDUCTS

A. Common with Section 16050, “Basic Electrical Materials and Methods, Electrical Identification” and the following:

1. Cable Labels: Heat shrink sleeve type, machine printed with alphanumeric cable designations. Adhesive tags are specifically forbidden.

PART 3 – EXECUTION

12 EXAMINATION

A. Examine pathway elements intended for cables. Check raceways, and other elements for compliance with space allocations, installation tolerance, hazards to cable installation, and other conditions affecting installation. Proceed with installation only after unsatisfactory conditions have been corrected.

13. APPLICATION OF MEDIA

A. Horizontal Cable for Data Service: Use UTP Category 6 cable for runs between wiring closets and workstation outlets.

B. Horizontal Cable for Voice Service: Use UTP Category 5E cable for runs between wiring closets and workstation outlets.

14 INSTALLATION

A. Wiring Method: Install wiring in raceways except above false ceiling, and within consoles, cabinets, desks, and counters. Conceal raceway and wiring.

B. Install cables using techniques, practices, and methods that are consistent with Category 5E and Category 6 rating of components and that ensure Category 5E and Category 6 performance of completed and linked signal paths, end to end.

C. Install cables without damaging conductors, shield, or jacket.

D. Do not bend cables, in handling or in installing, to smaller radii than minimums recommended by manufacturer.

E. Pull cables without exceeding cable manufacturer's recommended pulling tensions.

1. Pull cables simultaneously if more than one is being installed in same raceway.
2. Use pulling compound or lubricant if necessary. Use compounds that will not damage conductor or insulation.

3. Use pulling means, including fish tape, cable, rope, and basket-weave wire or cable grips, that will not damage media or raceway.

A. Install exposed cables parallel and perpendicular to surfaces or exposed structural members and follow surface contours where possible.

B. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.

C. Wiring within Wiring Closets and Enclosures: Provide conductors of adequate length. Train conductors to terminal points with no excess. Use lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.

D. Separation of Wires: Comply with TIA/EIA-569-A for separating unshielded cooper voice and data communication cabling from potential EMI sources, including electrical power lines and equipment.

E. Make splices, taps, and terminations only at indicated outlets, terminals, and cross-connect and patch panels.

F. Use splice and tap connectors compatible with media types.

15. GOUNDING

A. Comply with Section 16060, “Grounding and Bonding.”

B. Signal Ground Terminal: Locate in each equipment room and wiring closet; isolate from power system and equipment grounding.

C. Signal Ground Bus: Mount on wall of main equipment room with standoff insulators.

D. Signal Ground Backbone Cable: Extend from signal ground bus to signal ground terminal in each equipment room and wiring closet.

16. INSTALLATION IN EQUIPMENT ROOMS AND WIRING CLOSETS

A. Install 4’ X 8’ plywood backboards on walls of equipment rooms and wiring closets.

B. Mount patch panels, terminal strips, and other connecting hardware on backboards, unless otherwise indicated.

C. Group connecting hardware for cables into separate logical fields.

D. Use patch panels to terminate cables entering the space, unless otherwise indicated.

17 INSTALLATION STANDARDS

A. Comply with requirements in TIA/EIA-568-A and TIA/EIA-569-A.

18. IDENTIFICATION

A. In addition to requirements in the Article, comply with applicable requirements in Section 16050, “Basic Electrical Materials and Methods” and TIA/EIA-606.

B. System: Use a unique, three-syllable, alphanumeric designation for each cable, and label cable and jacks, connectors, and terminals to which it connects with same designation. Use logical and systematic designations for facility’s architectural arrangement.

1. First syllable identifies and locates equipment room or wiring closet where cables originate.

2. Second syllable identifies and locates cross-connect- or patch-panel field in which cables terminate.

3. Third syllable designates type of media (copper or fiber) and position occupied by cable pairs or fibers in field.

C. Workstation: Label cables within outlet boxes.

D. Within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use a different color for jacks and plugs of each service.

E. Cables. General: Label each cable within 4 inches of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.

F. Exposed Cables and Cables in Wire Troughs: Label each cable at intervals not exceeding 15 feet.

G. Cable Schedule: Post in prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish an electronic copy of final comprehensive schedules for Project, in software and format selected by Owner.

H. Cable Administration Drawings: Show building floor plans with cable administration point labeling. Identify labeling convention and show labels for telecommunications closet, and cables, entrance pathways and cables, terminal hardware, positions, horizontal cables, work area and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors. Follow convention of TIA/EIA-606. Furnish electronic record of all drawings, in software and format selected by Owner.

19. FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports:

B. Perform the following field tests and inspections and prepare test reports;

1. Operational Test: After installation of cables and connectors, demonstrate product capability and compliance with requirements. Test each signal path for end-to-end performance from each end of all pairs installed. Remove temporary connections when tests have been satisfactorily completed.

2. Copper Cable Procedures: Inspect for physical damage and test each conductor signal path for continuity and shorts. Use Class 2, bidirectional, Category 5E and category 6 tester. Test for faulty connectors, splices, and terminations. Test according to TIA/EIA-TSB67, “Transmission Performance Specifications for Field Testing of Unshielded Twisted-Pair Cabling Systems.” Link performance for UTP cables must meet minimum criteria of TIA/EIA-568-A.

C. Remove malfunctioning units, replace with new units, and retest as specified above. Submit no test results showing failures.

20. DEMONSTRATION

A. At substantial completion proving materials, labor and testing equipment to demonstrate compliance with contract documents to engineer.

END OF SECTION

SECTION 16900 - ELECTRICAL EQUIPMENT CONNECTIONS

PART 1 - GENERAL

1. RELATED DOCUMENTS

Drawings and general provisions of the Contract, including Division 1 Specification Sections, apply to this Section.

PART 2 - PRODUCTS

Not used

PART 3 - EXECUTION

2. MECHANICAL EQUIPMENT

A. All power wiring associated with the MECHANICAL SECTION of these Specifications shall be installed by the Electrical Contractor.

B. All HVAC control wiring shall be installed by the Mechanical Contractor.

C. Mechanical Contractor will furnish and set all motors.

D. Overload elements in all starters shall be selected according to actual motor nameplate full load current. Responsibility for this coordination shall lie with the Contractor who has furnished the particular starter. Starters, for motors furnished by Mechanical Contractor, shall be furnished by Mechanical Contractor and installed by Electrical Contractor.

E. All manual starting switches shall be furnished and installed by Electrical Contractor.

F. All disconnect switches shall be furnished and installed as indicated and as required by the Electrical Contractor.

G. All firestats shall be furnished and set under the MECHANICAL SPECIFICATION SECTIONS and electrically connected in the branch circuit wiring by the Electrical Contractor.

H. Refer to the SPECIFICATION SECTIONS and the MECHANICAL DRAWINGS for any additional electrical work required.

I. Should the Mechanical or any other Contractor desire to use equipment requiring larger motors than those indicated on the drawings or equipment requiring more elaborate controls than the equipment described in these specifications, the responsible contractor shall reimburse the Electrical Contractor for any extra materials or labor which the latter must furnish.

J. Provide all wiring and interconnections necessary for speed controllers on exhaust fans.

K. Starters, for motors furnished by Electrical Contractor, shall be furnished and installed by Electrical Contractor.

3. ELECTRICAL EQUIPMENT

A. The Electrical contractor shall be responsible for the installation of all equipment furnished under this section of the specifications.

B. It shall be the responsibility of the Electrical Contractor to verify that the sizes of the electrical equipment shall fit in the spaces allowed, and that the installations shall be in accordance with the requirements of the NEC and Manufacturer's recommendations relative to service and operation.

C. The Electrical Contractor shall notify the Architect of any space conflicts prior to when any installation revisions will result in removal of installed equipment and/or conduits. No additional compensation shall be allowed for failure to be so informed.

4. ARCHITECTURAL EQUIPMENT

A. This Contractor shall coordinate all rough-in requirements for all equipment specified by Architect. All mounting heights and locations shall be determined from shop drawing submittals prior to rough-in.

B. This Contractor shall coordinate all rough-in requirements for all equipment furnished by Owner. All mounting heights and locations shall be determined from shop drawing submittals prior to rough-in.

C. This Contractor shall coordinate all rough-in with the installation of all millwork. Adjust all mounting heights as required to clear countertops and backsplashes. Consult all shop drawings and coordinate with millwork provider for proper rough-in and installation of devices within millwork.

END OF SECTION

CONTRACT

This agreement is made and executed in _____ original copies, on this

_____ day of _____ 20_____, between

_____
_

acting through _____,

Party of the First Part, hereinafter designated as the "Contracting Agency", and _____

_____, Contractor,
Party of the Second Part, hereinafter designated as "Contractor".

In consideration of the agreements herein contained, to be performed by the parties hereto and of the payments hereinafter agreed to be made, it is mutually agreed as follows:

The Contractor will provide all materials, equipment and labor and perform the work required to complete in a thorough and workmanlike manner, to the satisfaction of the Contracting Agency,

State Project Number 578-36-0017 (323) entitled JULIA STREET CRUISE TERMINAL: TERMINAL IMPROVEMENTS located in Orleans Parish, consisting of

_____
_

_____
_

_____
_

in accordance with the plans and proposal on file at the Contracting Agency's Office, and with the 2006 Louisiana Standard Specifications for Roads and Bridges, and with the proposal, including the supplementary specifications, general provisions and special provisions accompanying said proposal; copy of said plans, specifications and proposal are made a part hereof and hereby become a part of this contract.

The Contractor agrees to accept and the Contracting Agency agrees to pay for the work at the prices stipulated in said Proposal in lawful money of the United States in the time and manner set forth in the Standard Specifications.

Performance shall begin on the date stipulated in the "Notice to Proceed" and shall be completed within the time specified in said Proposal, subject to such extensions as may be authorized.

Total cost of State Project Number 578-36-0017 (323) is
_____ DOLLARS ($_____).

This contract shall become effective on the date all parties hereto have signed the same.

In witness whereof, the _____ has hereunto subscribed his name, and the same has been approved by the _____

_____, and

_____, Contractor, has also hereunto subscribed his name.

BY _____
Contractor

_____
Federal Identification Number

_____ BY _____
Witness

_____ _____
Witness Name

_____
Contracting Agency

_____
Federal Identification Number

_____ BY _____
Witness

_____ _____
Witness Name

PAYMENT BOND

_____
_

_____
_

as Principal, and _____,

a surety company or companies authorized to do business in Louisiana, as Surety, are bound, in solido, unto

_____
_
and unto all subcontractors, workmen and furnishers of materials and equipment, jointly in the sum of

_____DOLLARS ($_____),
payable in lawful money of the United States, and to this bond do obligate their heirs, successors and assigns. In the case of cosureties, the cosureties assume an obligation in the sum of

_____DOLLARS ($_____),

for_____ and

_____DOLLARS ($_____),

for_____

The consideration of this bond is such, that if the Principal shall perform this contract, made and entered into on the

_____ day of _____, 20_____,

to construct State Project No. 578-36-0017 (323) entitled JULIA STREET CRUISE TERMINAL: TERMINAL IMPROVEMENTS located in Orleans Parish

_____, consisting of _____
according to the stipulations in said contract attached hereto and made a part hereof, pay all sums due on materials and supplies used and for wages earned by workmen employed on the work; this obligation shall be void; otherwise to remain in effect.

It is agreed by the parties that this bond is given in accordance with Louisiana Revised Statutes of 1950, Title 38, Chapter 10.

In faith whereof, we have subscribed this obligation at _____, Louisiana

Witness our hands and seals, this _____ day of _____, 20_____,

Witness

_____

Principal

_____
_____(Seal)

By

_____

_____

Type or Printed Name

_____

First Surety

_____
_____(Seal)

By

Attorney-in-Fact

_____

_____

Type or Printed Name

_____

Second Surety

_____
_____(Seal)

By

Attorney-in-Fact

_____

_____

Type or Printed Name

PERFORMANCE BOND

_____

_____

as Principal, and _____,
a surety company or companies authorized to do business in Louisiana, as Surety, are bound, in solido, unto

_____

in the sum of

_____DOLLARS ($_____),
payable in lawful money of the United States, in order to secure the full and faithful performance and timely completion of the project described below according to its plans and specifications, including, but not limited to the payment of stipulated damages as specified in the contract, and to this bond do obligate their heirs, successors and assigns. In the case of cosureties, the cosureties assume an obligation in the sum of

_____DOLLARS ($_____),

for_____ and

_____DOLLARS ($_____),

for_____

The consideration of this bond is such, that if the Principal shall perform this contract, made and entered into on the

_____ day of _____, 20_____,

to construct State Project No. _____

entitled _____

Parish _____, consisting of _____
according to the stipulations in said contract attached hereto and made a part hereof, at the time and in the manner and form specified; perform all labor and work; and shall furnish all materials as specified in said contract, and the plans a specifications thereto attached and made a part thereof; this obligation shall be void; otherwise to remain in effect.

It is agreed by the parties that this bond is given in accordance with Louisiana Revised Statutes of 1950, Title 38, Chapter 10.

In faith whereof, we have subscribed this obligation at _____, Louisiana

Witness our hands and seals, this _____ day of _____, 20_____,

Witness

_____
Principal

_____ By _____(Seal)

_____ _____
Type or Printed Name

_____
First Surety

_____ By _____(Seal)
Attorney-in-Fact

_____ _____
Type or Printed Name

_____
Second Surety

_____ By _____(Seal)
Attorney-in-Fact

_____ _____
Type or Printed Name

NON COLLUSION DECLARATION

A sworn statement shall be submitted in the form of an affidavit as indicated below, executed and sworn to by the bidder before persons authorized by laws of the State to administer oaths.

Affidavit

State Project Number: _____

Name of Project: _____

Parish: _____

(an individual)
(a partnership)
_____ (a corporation)

certify that:

(1) That affiant employed no person, corporation, firm, association, or other organization, either directly or indirectly, to secure the public contract under which he received payment, other than persons regularly employed by the affiant whose services in connection with the construction, alteration or demolition of the public building or project or in securing the public contract were in the regular course of their duties for affiant, and

(2) That no part of the contract price received by affiant was paid or will be paid to any person, corporation, firm, association, or other organization for soliciting the contract, other than the payment of their normal compensation to persons regularly employed by the affiant whose services in connection with the construction, alteration or demolition of the public building or project were in the regular course of their duties for affiant.

(an individual)
(a partnership)
(a corporation)

Signed _____

By _____

Title

_____

Parish or county _____

State of _____

Subscribed and sworn to before me this _____ day of_____, 20 ____.

My commission expires the _____ day of _____, 20 ____.

_____
Notary Public

JULIA STREET CRUISE TERMINAL
TERMINAL IMPROVEMENTS
December 2, 2010
STATE PROJECT NO. 578-36-0017 (323)

ATTESTATION CLAUSE REQUIRED BY LA. R.S. 38:2227 (PAST CRIMINAL CONVICTIONS OF BIDDERS)

Appearer, as a Bidder on the above-entitled Public Works Project, does hereby attest that:

A. No sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or has entered a plea of guilty or nolo contendere to, any of the following state crimes or equivalent federal crimes:

(a) Public bribery (R.S. 14:118)
(b) Corrupt influencing (R.S. 14:120)
(c) Extortion (R.S. 14:66)
(d) Money laundering (R.S. 14:23)

B. Within the past five years from the project bid date, no sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or has entered a plea of guilty or nolo contendere to any of the following state crimes or equivalent federal crimes, during the solicitation or execution of a contract or bid awarded pursuant to the provisions of Chapter 10 of Title 38 of the Louisiana Revised Statutes:

(a) Theft (R.S. 14:67)
(b) Identity Theft (R.S. 14:67.20)
(c) Theft of a business record (R.S.14:67.20)
(d) False accounting (R.S. 14:70)
(e) Issuing worthless checks (R.S. 14:71)
(f) Bank fraud (R.S. 14:71.1)
(g) Forgery (R.S. 14:72)
(h) Contractors; misapplication of payments (R.S. 14:202)
(i) Malfeasance in office (R.S. 14:134)

Name of Bidder	Name of Authorized Signatory of Bidder
Date	Title of Authorized Signatory of Bidder

Signature of Authorized Signatory Bidder

CERTIFICATE OF LIABILITY INSURANCE

Contractors shall provide insurance certificate to the Board as required by the SPECIAL PROVISIONS. Attached is a sample insurance certificate with the minimum information required to be provided by the Contractor.

ACORD. CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YY)

PRODUCER

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURERS AFFORDING COVERAGE

INSURED

INSURER A:

INSURER B:

INSURER C:

INSURER D:

INSURER E:

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
	GENERAL LIABILITY				EACH OCCURRENCE	$
	COMMERCIAL GENERAL LIABILITY				FIRE DAMAGE (Any one fire)	$
	CLAIMS MADE OCCUR				MED EXP (Any one person)	$
					PERSONAL & ADV INJURY	$
	GEN'L AGGREGATE LIMIT APPLIES PER:				GENERAL AGGREGATE	$
	POLICY PRO-JECT LOC				PRODUCTS - COMP/OP AGG	$
	AUTOMOBILE LIABILITY				COMBINED SINGLE LIMIT (Ea accident)	$
	ANY AUTO				BODILY INJURY (Per person)	$
	ALL OWNED AUTOS				BODILY INJURY (Per accident)	$
	SCHEDULED AUTOS				PROPERTY DAMAGE (Per accident)	$
	HIRED AUTOS					
	NON-OWNED AUTOS					
	GARAGE LIABILITY				AUTO ONLY - EA ACCIDENT	$
	ANY AUTO				OTHER THAN AUTO ONLY: EA ACC	$
					AGG	$
	EXCESS LIABILITY				EACH OCCURRENCE	$
	OCCUR CLAIMS MADE				AGGREGATE	$
						$
	DEDUCTIBLE					$
	RETENTION $					$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY				WC STATU-TORY LIMITS OTH-ER	
					E.L. EACH ACCIDENT	$
					E.L. DISEASE - EA EMPLOYEE	$
					E.L. DISEASE - POLICY LIMIT	$
	OTHER					

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/EXCLUSIONS ADDED BY ENDORSEMENT/SPECIAL PROVISIONS

CERTIFICATE HOLDER | ADDITIONAL INSURED; INSURER LETTER: ____

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL _____ DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE

ACORD 25-S (7/97)

© ACORD CORPORATION 1988

Board of Commissioners of the Port of New Orleans

MINORITY & WOMEN CONTRACTOR'S PARTICIPATION

MONTHLY REPORT

MONTH_____ YEAR

Name of MBE/WBE Firm and Corporate Principal	Indicate MBE or WBE	Subcontract Description	Subcontract $ Value	% of Total Prime Contract Value	Current Month Subcontractor Earnings	Subcontractor Earnings to Date	% Complete	Comments

SAMPLE (NOT REQUIRED WITH BID)

PRIME CONTRACTOR:_____

PROJECT TITLE:_____

NTP Date:_____

Contract Completion Date_____

I Certify the above Information to be valid and true to the best of my knowledge and Intentions;

_____
Authorized Officer

_____
Title

_____
Date

_____
Contract Person for Prime Contractor

_____
Telephone

_____
FAX

REQUEST TO SUBLET

SUBMIT TO ENGINEER

Date	
State Project Number	
Name of Project	
Parish	

I desire to sublet the following items of work to the undersigned subcontractor:

ITEM NO.	DOLLAR AMOUNT	ITEM NO	DOLLAR AMOUNT

I, as contractor, understand and agree that the subcontractor shall not relieve me of my liability under the contract and bonds, and certify that the subcontractor has the experience, equipment and personnel to satisfactorily perform the subcontracted work, and that the subcontracted work is covered by a written agreement with the subcontractor.

Contractor	**Lic No**
Address	**Tax ID #**
Phone	**Facsimile No**
Signature	**e-mail**
Name	**Title**

I, as subcontractor, understand and agree that no part of the above listed subcontracted work shall be sublet; and I certify that the subcontracted work is covered by a written agreement with the contractor which states that the work shall be performed in accordance with the Contracting Agency construction contract for this project; and that the minimum wages stated in said contract shall be applied to the subcontracted work , if in fact minimum wages are stated in said contract.

Subcontractor	**Lic No**
Address	**Tax ID #**
Phone	**Facsimile No**
Signature	**e-mail**
Name	**Title**

BOARD OF COMMISSIONERS OF THE PORT OF NEW ORLEANS
NOTE TO PROSPECTIVE BIDDERS ON
CONTRACT FOR

JULIA STREET CRUISE TERMINAL
TERMINAL IMPROVEMENTS

Requisition No. 055473
State Project No. 578-36-0017(323)

APPENDIX #1-APPROVED MANUFACTURERS

SPECIFICATIONS:

1. The following manufacturers are approved as noted as an equal and added to the applicable specification sections:

Manufacturer	Description
MPI Group	Hollow Metal Doors and Frames
Security Metal Products Corp.	Hollow Metal Doors and Frames
Oshkosh Architectural Door Co.	Wood Doors
American Decorative “The Wave”	Suspended Metal Ceilings
Firestone	Rooofing
Daltile	CFT-1: Plaza Nova
Daltile	CFT-2: Porcealto
Daltile	CFT-3: Keystones
Daltile	CWT-1: Pzazz or Fabrique
Daltile	CWT-2: Modern Dimensions
Daltile	CWT-3: Keystones
Zurn	P-1 Water Closet
Zurn	P-1A Water Closet
Zurn	P-2 Lavatory
Zurn	P-3 & P-3A Urinal
Zurn	P-I & P-IA Water Closet Seat
Zurn	P-4 Sink
Zurn	P-5 Service Sink
Zurn	P-6 Electric Water Cooler
Zurn	P-1B Water Closet
Zurn	P-7 Eyewash
Zurn	P-7 Eyewash Thermostatic Mixing Valve
Zurn	P-8 Shower
Zurn	HB Hose Bibb
Zurn	HB-1 Hose Bibb
Zurn	FD Floor Drain
Zurn	FD-1 Floor Drain
Zurn	RD Roof Drain
Zurn	AD Area Drain
Zurn	TP Trap Primer
Nailor Industries	Grilles, Registers & Diffusers
United Enertech	Louvers
Reddi Mfg.	Electric Duct Heating Coils
Nailor Industries	VAV Terminals
Twin City Fan	Exhaust Fans and Intakes
Cook	Fans
Titus	Grilles, Registers, Diffusers
Raywall	Electric Duct Heaters
Eastern Sheet Metal	Spiral
Titus	Single Duct/Fan Powered Terminals

Ruskin	Fire Dampers
Ruskin	Motorized Control Dampers
Ruskin	Manual Dampers
Trane	Air Cooled Scroll Chiller
Trane	Air Handling Unit
Trane	Electric Duct Heater
Trane	Electric Unit Heater
Trane	VFD
Carrier	Series 39M Central Station Air Handling Units
Carrier	Series 42 Fan Coil Units
Carrier	Series 30RM Air Cooled Chillers
Chicago Faucets	P-2
Chicago Faucets	P-4
Chicago Faucets	P-5
*Delany	P-1 & P-1A (Provide 1-1402-1.28)
Delany	P-3 & P-3A
Guardian	P-7
Halsey Taylor	P-6
*Baltic	P-1 (Provide 1-28 GPF)
*Adriatic	P-1A (Provide 1-28 GPF)
Maverick	P-2
Cascade	P-3 & P-3A
Willoughby	P-1B
*LSI	F1, F1E (Approve if ballast is T5 instant start)
LSI	F2, F2E, F2T, F5A, F5AE, F5B, F5BE,F5C, F10, F10E
*Pinnacle	F3, F3E, F3T, F6, F6E, F9, F15, F16, F17(Approve if fixture has recessed round pen.)
LSI	
INDY	F11, F12
LC Doane	F13
Pinnacle	F14, FI4E, FI4T, F19, FI9E, FI9T
Acculite	F18
Evenlite	EX
Lutron	OS, LCP
Williams	F1, F1E, F2, F2E, F2T, F3, F3E, F3T, F5A, F5AE, F5B, F5BE, F5C, F6, FOE, F9, F12, F14, 14E, F14T, F15, F16, F17, F18, F19, F19E, F19T, EM
**Lumetta	F4, F8, F8E (Not Approved- Not enough information; no data Received)
Elco	F11
CD Lighting	F13
Daybrite	F1, F1E, F10, F10E
*Finelite	F2, F2E,F2T (Approved if lens looks like Fixture Type Fl)
Capri	F5A, F5AE, F5B, F5BE, FEC
**Finelite	F3, F3E, F3T, F6, F6E, F9, F14, F14E, F14T, F15,F16, F17, F19, F19E, FI9T(Not Approved- Not Similar Fixture, Requires Curve Basket
**Daybrite	F18— Not Approved Fixture Not Similar
Omega	F11, F12
Newstar	F13
McPhilben	EX
Douglas	LCP
Krueger	VAV Boxes
Data Aire	Computer Room A/C Unit
Armstrong	Compression Tank and Aire Separator
Penn	Exhaust Fans
Danfoss	VFD's
Krueger	Grills, Registers, Diffusers
Pottorff	Manual and Motorized Dampers

Pottorff	Fire Dampers, Smoke Dampers, Access Doors
Pottorff	Louvers
Dace	Spins, Takeoffs, Dampers
York	Chiller
York	Air Handling Units
Environmental Technologies	Fan Coil Units
Environmental Technologies	VAV Boxes
Stulz	A/C Units
Delta	WC Valve
Delta	Lav Faucet
Delta	Urinal Valve
Delta	Sink Faucet
Delta	Svs Sink Faucet
Oasis	Water Coller
Delta	Shower Valve
Greenheck	Louvers, Control Damers

*Approved As Noted
** Not Approved

However, detailed brochures must be submitted, and products and equipment must meet requirements of plans and specifications. It is the Contractor's responsibility to ascertain that the products and equipment meet the requirements of the Contract Documents,

END OF APPENDIX #1

BOARD OF COMMISSIONERS OF THE PORT OF NEW ORLEANS
NOTE TO PROSPECTIVE BIDDERS ON
CONTRACT FOR

JULIA STREET CRUISE TERMINAL
TERMINAL IMPROVEMENTS

Requisition No. 055473
State Project No. 578-36-0017(323)

January 6, 2011

FOR BIDS DUE ON
JANUARY 18, 2011 AT 2:00 P.M.

To Plan Holders:

Please note the following:

ADDENDUM NO. 1

SPECIFICATIONS:

Item No. 1. **The Bid Opening for this project is hereby rescheduled to Tuesday, January 18, 2011 at 2:00 p.m. local time.** Notice to Contractors, 1st paragraph, delete "Monday, January 17, 2011" and replace with "Tuesday, January 18, 2011".

Item No. 2. **Supplemental Specifications:** Please delete the first paragraph under the section titled **PERFORMANCE OF WORK BY CONTRACTOR** on pages SS 23 - 24. Specific requirements for subletting contract appears in **GENERAL PROVISIONS 2009, SECTION 8.01 SUBLETTING OF CONTRACT**

Item No. 3. **SECTION 10160-METAL TOILET PARTITIONS, item 3C.: Change to read "**Doors and pilasters shall be Model Forum # FP-500, floor anchored/overhead braced by Metpar Corp or equal"

Item No. 4. **SECTION 09690WATER VAPOR EMISSION CONTROL SYSTEMS**: Item 9A: Delete "No Substitutions"

Item No. 5. The following manufacturers have been approved as noted as an equal for prior approvals:

Manufacturer	**Description**
York	Chiller
York	Air Handling Unit
Environmental Technologies	Fan Coil Units
Environmental Technologies	VAV Boxes
Stulz	A/C Unit
American Sanitary Partition Co.	Metal Toilet Partitions
YKK AP	Storefront and Curtainwall
Metalaire	Diffusers, Registers and Grills
Metalaire	Celing Diffusers "D" & "CD"
Metalaire	Security "SD"
Metalaire	Linear Bar "LS"
Metalaire	Eggcrate "R, R-1, R-2, R-3"
Metalaire	VAV Terminals
Safe Air	Louvers
AO Smith	Water Heater 1

State	Water Heater
AO Smith	Water Heater 2
EST	Fire alarm system
Carrier	Air Cooled Chiller
Carrier	Air Handling Units
Carrier	Fan Coil Units
Krueger	VAV Boxes
Data Aire	Computer Room A/C Unit
Armstrong	Compression Tank and Aire Separator
Penn	Exhaust Fans
Danfoss	VFD's
Krueger	Grills, Registers, Diffusers
Pottorff	Manual and Motorized Dampers
Pottorff	Fire Dampers, Smoke Dampers, Access Doors
Pottorff	Louvers
Dace	Spins, Takeoffs, Dampers
Metalux	Fixtures F10, F10E
Promat Firetemp LLC	Spray-on Fireproofing

However, detailed brochures must be submitted and equipment must meet requirements of plans and specifications. It is the Contractor's responsibility to ascertain that the equipment meets the requirements of the Contract Documents,

DRAWINGS:

Item No. 6. **Drawing BH-12100-A57**. Delete this drawing issued with the December 17, 2010 bid documents and replace with attached revised Drawing BH-12100-A57.

Item No. 7. **Drawing BH-12100-A58** Delete this drawing issued with the December 17, 2010 bid documents and replace with attached revised Drawing BH-12100-A58.

Item No. 8. **Drawing BH-12100-E4.2** Delete this drawing issued with the December 17, 2010 bid documents and replace with attached revised Drawing BH-12100-E4.2.

Very truly yours,

Darren J. Austin, PE
Project Manager
Board of Commissioners of the
Port of New Orleans
New Orleans, Louisiana

BOARD OF COMMISSIONERS OF THE PORT OF NEW ORLEANS
NOTE TO PROSPECTIVE BIDDERS ON
CONTRACT FOR

JULIA STREET CRUISE TERMINAL
TERMINAL IMPROVEMENTS

Requisition No. 055473
State Project No. 578-36-0017(323)

January 11, 2011

FOR BIDS DUE ON
JANUARY 18, 2011 AT 2:00 P.M.

To Plan Holders:

Please note the following:

ADDENDUM NO. 2

SPECIFICATIONS:

Item No. 1. **SECTION 02364 – STEEL PIPE PILES**, Part 2.5.A.5: change the wall thickness to "0.365" min."

Item No. 2. The following manufacturers have been approved as a "prior approved equal":

Manufacturer	Description
Metalaire	Fire Dampers
American Coolair	Exhaust Fans
Metalaire	Louvers
Safe Air/Dowco	Louvers
Ardex MC Plus	Water Vapor Emission Control Systems
Dorma	Door closers and exit devices

However, detailed brochures must be submitted and equipment must meet requirements of plans and specifications. It is the Contractor's responsibility to ascertain that the equipment meets the requirements of the Contract Documents,

DRAWINGS:

Item No. 3. **Electrical Drawings:** Add the following general note to sheets E3.1, E3.2, E4.1, and E4.2.: "Contractor shall protect all existing security equipment during construction. In the event any security equipment shall be demolished, contractor shall coordinate with Owner. Equipment shall be removed by Owner."

Item No. 4. **Drawing S0.1,** General Note 8.D: change the wall thickness to 0.365" min

Very truly yours,

Darren J. Austin

Darren J. Austin, PE
Project Manager
Board of Commissioners of the
Port of New Orleans
New Orleans, Louisiana

LOUISIANA UNIFORM PUBLIC WORK BID FORM

TO: Port of New Orleans
1350 Port of New Orleans Place
P.O. Box 60046
New Orleans, LA 70160

BID FOR: STATE PROJECT NO. 578-36-0017 (323)

JULIA STREET CRUISE TERMINAL
TERMINAL IMPROVEMENTS

The undersigned bidder hereby declares and represents that she/he; a) has carefully examined and understands the Bidding Documents, b) has not received, relied on, or based his bid on any verbal instructions contrary to the Bidding Documents or any addenda, c) has personally inspected and is familiar with the project site, and hereby proposes to provide all labor, materials, tools, appliances and facilities as required to perform, in a workmanlike manner, all work and services for the construction and completion of the referenced project, all in strict accordance with the Bidding Documents prepared by Port of New Orleans Engineering Services, Engineering Department, 1350 Port of New Orleans Place, P.O. Box 60046, New Orleans, LA 70160, Phone: 504-528-3296, Fax: 504-528-3278 and dated December 17, 2010.

Bidders must acknowledge all addenda. The Bidder acknowledges receipt of the following **ADDENDA:** (Enter the number the Designer has assigned to each of the addenda that the Bidder is acknowledging) 1, 2.

TOTAL BASE BID: For all work required by the Bidding Documents (including any and all unit prices designated "Base Bid" * but not alternates) the sum of:

Eight Million Nine Hundred Seventy Thousand Dollars ($ 8,970,000.00)

ALTERNATES: For any and all work required by the Bidding Documents for Alternates including any and all unit prices designated as alternates in the unit price description.

Alternate No. 1 for the lump sum of:

N/A Dollars ($ N/A)

NAME OF BIDDER: Ryan Gootee General Contractors, LLC

ADDRESS OF BIDDER: 1100 Ridgewood Drive, Metairie, LA 70001

LOUISIANA CONTRACTOR'S LICENSE NUMBER: 43165

NAME OF AUTHORIZED SIGNATORY OF BIDDER: Ryan Gootee

TITLE OF AUTHORIZED SIGNATORY OF BIDDER: President/CEO

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER **:

DATE: January 18, 2011

* If someone other than a corporate officer signs for the Bidder/Contractor, a copy of a corporate resolution or other signature authorization shall be required for submission of bid. Failure to include a copy of the appropriate signature authorization, if required, may result in the rejection of the bid unless bidder has complied with La. R.S. 38:2212(A)(1)(c) or RS 38:2212(O) .

BID SECURITY in the form of a bid bond, certified check or cashier's check as prescribed by LA RS 38:2218.A is attached to and made a part of this bid.

BID BOND
FOR

Julia Street Cruise Terminal, Terminal Improvements State Project #578-36-0017 (323)

Date: January 18, 2011

KNOW ALL MEN BY THESE PRESENTS:

That Ryan Gootee General Contractors, LLC of Metairie, Louisiana, as Principal, and Hartford Fire Insurance Company, as Surety, are held and firmly bound unto the Board of Commissioners of the Port of New Orleans (Obligee), in the full and just sum of five (5%) percent of the total amount of this bid, including all alternates, lawful money of the United States, for payment of which sum, well and truly be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally firmly by these presents.

Surety represents that it is listed on the current U. S. Department of the Treasury Financial Management Service list of approved bonding companies as approved for an amount equal to or greater that the amount for which it obligates itself in this instrument or that it is a Louisiana domiciled insurance company with at least an A - rating in the latest printing of the A. M. Best's Key Rating Guide. If surety qualifies by virtue of its Best's listing, the Bond amount may not exceed ten percent of policyholders' surplus as shown in the latest A. M. Best's Key Rating Guide.

Surety further represents that it is licensed to do business in the State of Louisiana and that this Bond is signed by surety's agent or attorney-in-fact. This Bid Bond is accompanied by appropriate power of attorney.

THE CONDITION OF THIS OBLIGATION IS SUCH that, whereas said Principal is herewith submitting its proposal to the Obligee on a Contract for:

Julia Street Cruise Terminal, Terminal Improvements State Project #578-36-0017 (323)

NOW, THEREFORE, if the said Contract be awarded to the Principal and the Principal shall, within such time as may be specified, enter into the Contract in writing and give a good and sufficient bond to secure the performance of the terms and conditions of the Contract with surety acceptable to the Obligee, then this obligation shall be void; otherwise this obligation shall become due and payable.

Ryan Gootee General Contractors, LLC
PRINCIPAL (BIDDER)

BY: _____
AUTHORIZED OFFICER-OWNER-PARTNER

Hartford Fire Insurance Company
SURETY

BY: Kathleen L. Berni
AGENT OR ATTORNEY-IN-FACT(SEAL)
Kathleen L. Berni, Attorney-in-fact

Countersigned: LA Resident Agent
Arthur J. Gallagher Risk Management Services, Inc.

By: Kathleen L. Berni
Kathleen L. Berni, Lic 201148

POWER OF ATTORNEY

Direct Inquiries/Claims to:
THE HARTFORD
BOND, T-4
P.O. BOX 2103, 690 ASYLUM AVENUE
HARTFORD, CONNECTICUT 06115
call: 888-266-3488 *or fax:* 860-757-5835

KNOW ALL PERSONS BY THESE PRESENTS THAT: **Agency Code: 43-483339**

- [X] **Hartford Fire Insurance Company**, a corporation duly organized under the laws of the State of Connecticut
- [X] **Hartford Casualty Insurance Company**, a corporation duly organized under the laws of the State of Indiana
- [X] **Hartford Accident and Indemnity Company**, a corporation duly organized under the laws of the State of Connecticut
- [ ] **Hartford Underwriters Insurance Company**, a corporation duly organized under the laws of the State of Connecticut
- [ ] **Twin City Fire Insurance Company**, a corporation duly organized under the laws of the State of Indiana
- [ ] **Hartford Insurance Company of Illinois**, a corporation duly organized under the laws of the State of Illinois
- [ ] **Hartford Insurance Company of the Midwest**, a corporation duly organized under the laws of the State of Indiana
- [ ] **Hartford Insurance Company of the Southeast**, a corporation duly organized under the laws of the State of Florida

having their home office in Hartford, Connecticut, (hereinafter collectively referred to as the "Companies") do hereby make, constitute and appoint, ***up to the amount of unlimited:***

Ronald J. Schexnaydre, Kathleen L. Berni, George Villars Baus Jr., James J. Lynch III
of
Metairie, LA

their true and lawful Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, to sign its name as surety(ies) only as delineated above by ☒, and to execute, seal and acknowledge any and all bonds, undertakings, contracts and other written instruments in the nature thereof, on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

In Witness Whereof, and as authorized by a Resolution of the Board of Directors of the Companies on January 22, 2004 the Companies have caused these presents to be signed by its Assistant Vice President and its corporate seals to be hereto affixed, duly attested by its Assistant Secretary. Further, pursuant to Resolution of the Board of Directors of the Companies, the Companies hereby unambiguously affirm that they are and will be bound by any mechanically applied signatures applied to this Power of Attorney.

Paul A. Bergenholtz, Assistant Secretary

M. Ross Fisher, Assistant Vice President

STATE OF CONNECTICUT }
COUNTY OF HARTFORD } ss. Hartford

On this 1st day of February, 2004, before me personally came M. Ross Fisher, to me known, who being by me duly sworn, did depose and say: that he resides in the County of Hartford, State of Connecticut; that he is the Assistant Vice President of the Companies, the corporations described in and which executed the above instrument; that he knows the seals of the said corporations; that the seals affixed to the said instrument are such corporate seals; that they were so affixed by authority of the Boards of Directors of said corporations and that he signed his name thereto by like authority.

Scott E. Pascka
Notary Public
My Commission Expires October 31, 2012

CERTIFICATE

I, the undersigned, Assistant Vice President of the Companies, DO HEREBY CERTIFY that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is still in full force effective as of January 18, 2011

Signed and sealed at the City of Hartford.

Gary W. Stumper, Assistant Vice President

CORPORATE RESOLUTION

BE IT RESOLVED by the Board of Directors of Ryan Gootee General Contractors, LLC in a meeting duly assembled that Ryan Gootee, President/CEO of the Corporation, be and he/she is hereby authorized, empowered, and directed for and on the Corporation to negotiate for and sign any and all bid proposals and/or contractors which this corporation might enter into for the furnishing of services for the Corporation under such terms, conditions and stipulations, and for such consideration as he might deem to the best interest of the Corporation.

* * * * * * * * * * *

I, Ryan Gootee (Name) President/CEO
~~Secretary~~ of Ryan Gootee General Contractors, LLC do hereby certify that the above and forgoing is a true and correct copy of a Resolution unanimously adopted at a meeting of the Board of Directors of said Corporation held on the 6th day of January, 2006, at which meeting all members of the Board of Directors were present and voted thereon and that said Resolution has been spread upon the minute books of the Corporation, and same is now in full force and effect.

WITNESS MY SIGNATURE, this 17th day of January, 2011, at Metairie, Louisiana

Ryan Gootee
President/CEO

State of Louisiana

State Licensing Board for Contractors

This is to Certify that:

RYAN GOOTEE GENERAL CONTRACTORS, L.L.C.
P.O. Box 56253
Metairie, LA 70055-6253

is duly licensed and entitled to practice the following classifications

BUILDING CONSTRUCTION; SPECIALTY: CONSTRUCTION MANAGEMENT (BUILDING)

Witness our hand and seal of the Board dated,
Baton Rouge, LA 1st day of January 2009

Director

Chairman

Secretary-Treasurer

Expiration Date: January 31, 2012

License No: 43165

This License Is Not Transferrable

PORT OF
NEW ORLEANS

January 27, 2011

Ryan Gootee General Contractors, LLC
1100 Ridgewood Drive
Metairie, Louisiana 70001

Attn: Mr. Ryan Gootee, President/CEO

RE: JULIA STREET CRUISE TERMINAL
TERMINAL IMPROVEMENTS
STATE PROJECT NO. 578-36-0017(323)
REQ. NO. 055473 W. O. No. 1-938
NOTICE OF AWARD

Dear Mr. Gootee:

I am pleased to advise you that the Board of Commissioners of the Port of New Orleans has accepted your Total Base Bid in accordance with your completed Louisiana Uniform Public Work Bid Form in the sum of $8,970,000.00 for the subject project. The Board has awarded this contract to Gootee General Contractors, LLC at it's regularly scheduled Board Meeting held on January 27, 2011.

Our attorneys have prepared a contract consistent with the plans and specifications, which must be signed within ten calendar days from receipt of this letter. Before the contract can be executed, but within five days of receipt of this letter, you must present the following to the Board's Risk Manager:

(1) Insurance coverage, as more fully described in GENERAL CONDITIONS under 4. Contract Documents - 4.03 (a thru f) Insurance Requirements

(2) A performance bond in the full amount of your bid - Please see GENERAL CONDITIONS under 4. Contract Documents - 4.01 - Requirement of Payment and Performance Bonds (a and b)

The telephone number for the Board's Risk Manager, Mr. William Sickinger, is 528-3273.

Upon submittal and acceptance by the Board's Risk Manager of the foregoing, please contact Mr. Joseph Fritz, the Board's Staff Attorney, at 528-3226 for the purpose of signing the contract.

You are requested to advise this Board promptly of the number of complete sets of plans and specifications you will need, over and above those which you received during the bidding period.

Please be advised that this contract will be administered by our Construction Services group of the Port Development Division. All verbal requests for services and materials should be made to the writer. The Construction Section's phone number is (504) 528-3288. All correspondence is to be directed to the writer with three additional copies. Please indicate our project description, requisition number, work order number on all correspondence.

Sincerely,

William J. Meliet
Manager Construction Services

WJM/bgh

cc Ms. Carol Balthazar
Riverworks
201 St. Charles Ave., Suite 2570
New Orleans, Louisiana 70170

Mr. Randall Withers
Port Priority Program
LA Department of Transportation & Development
8900 Jimmy Wedell Dr
Baton Rouge, Louisiana 70807

Mr. Michael J. Stack, P.E., P.L.S.
Louisiana Department of Transportation and Development
Public Works & Flood Control
7252 Lakeshore Drive
New Orleans, LA 70124

Mr. Don Helgeson
Mathes Brierre Architects.
A Professional Architectural Corporation
201 St. Charles Avenue
Forty-First Floor
New Orleans, Louisiana 70170-4100

CONTRACT

This agreement is made and executed in four (4) original copies, on this 31st day of January 2011, between Board of Commissioners of the Port of New Orleans

acting through Gary P LaGrange, its President & Chief Executive Officer

Party of the First Part, hereinafter designated as the "Contracting Agency", and Ryan Gootee Gen Contractors LLC, Contractor,

Party of the Second Part, hereinafter designated as "Contractor".

In consideration of the agreements herein contained, to be performed by the parties hereto and of the payments hereinafter agreed to be made, it is mutually agreed as follows:

The Contractor will provide all materials, equipment and labor and perform the work required to complete in a thorough and workmanlike manner, to the satisfaction of the Contracting Agency,

State Project Number 578-36-0017 (323) entitled JULIA STREET CRUISE TERMINAL: TERMINAL IMPROVEMENTS located in Orleans Parish, consisting of

additions, alterations, improvements to Julia St Cruise Terminal

in accordance with the plans and proposal on file at the Contracting Agency's Office, and with the 2006 Louisiana Standard Specifications for Roads and Bridges, and with the proposal, including the supplementary specifications, general provisions and special provisions accompanying said proposal; copy of said plans, specifications and proposal are made a part hereof and hereby become a part of this contract.

The Contractor agrees to accept and the Contracting Agency agrees to pay for the work at the prices stipulated in said Proposal in lawful money of the United States in the time and manner set forth in the Standard Specifications.

Performance shall begin on the date stipulated in the "Notice to Proceed" and shall be completed within the time specified in said Proposal, subject to such extensions as may be authorized.

Total cost of State Project Number 578-36-0017 (323) is Eight million nine hundred seventy thousand and No/100ths DOLLARS ($ 8,970,000.00).

This contract shall become effective on the date all parties hereto have signed the same.

In witness whereof, the Pres & CEO Gary P LaGrange has hereunto subscribed his name, and the same has been approved by the Board of Commissioners Port of NO

_____, and

Ryan Gootee General Contractors LLC Contractor, has also hereunto subscribed his name.

BY Ryan Gootee General Contractors LLC
Contractor

61-1479496
Federal Identification Number

BY _____

Witness

Witness

Board of Commissioners of the Port of New Orleans
Name

Contracting Agency

72-6000174
Federal Identification Number

BY _____

Witness

Witness

Gary P LaGrange
Name

President & Chief Executive Officer

Bond No. 43BCSFV3281

PERFORMANCE BOND

Ryan Gootee General Contractors, LLC

as Principal, and Hartford Fire Insurance Company,
a surety company or companies authorized to do business in Louisiana, as Surety, are bound, in solido, unto

Board of Commissioners of the Port of New Orleans

in the sum of

Eight Million Nine Hundred Seventy Thousand and no cents DOLLARS ($ 8,970,000.00),
payable in lawful money of the United States, in order to secure the full and faithful performance and timely completion of the project described below according to its plans and specifications, including, but not limited to the payment of stipulated damages as specified in the contract, and to this bond do obligate their heirs, successors and assigns. In the case of cosureties, the cosureties assume an obligation in the sum of

_____ DOLLARS ($_____),

for _____ and

_____ DOLLARS ($_____),

for _____

The consideration of this bond is such, that if the Principal shall perform this contract, made and entered into on the 31st day of January, 20 11,

to construct State Project No. 578-36-0017 (323)

entitled Julia Street Cruise Terminal - Terminal Improvements

Parish Orleans, consisting of Demolition of Existing Interior & Remodel as well as Addition of New Bridge/Walkway for Entrance & Exit out of Cruise Ships
according to the stipulations in said contract attached hereto and made a part hereof, at the time and in the manner and form specified; perform all labor and work; and shall furnish all materials as specified in said contract, and the plans a specifications thereto attached and made a part thereof; this obligation shall be void; otherwise to remain in effect.

It is agreed by the parties that this bond is given in accordance with Louisiana Revised Statutes of 1950, Title 38, Chapter 10.

In faith whereof, we have subscribed this obligation at Metairie, Louisiana

Witness our hands and seals, this 31st day of January, 20 11.

Witness

Witness

Witness

Witness

Ryan Gootee General Contractors, LLC
Principal

By _____ (Seal)

RYAN GOOTEE
Type or Printed Name

Hartford Fire Insurance Company
First Surety

By _____ (Seal)
Attorney-in-Fact

Kathleen L. Berni
Type or Printed Name

Second Surety

By _____ (Seal)
Attorney-in-Fact

Type or Printed Name

Req. No. 055473

PRB 2

Bond No. 43BCSFV3281

PAYMENT BOND

Ryan Gootee General Contractors, LLC

as Principal, and Hartford Fire Insurance Company,

a surety company or companies authorized to do business in Louisiana, as Surety, are bound, in solido, unto

Board of Commissioners of the Port of New Orleans

and unto all subcontractors, workmen and furnishers of materials and equipment, jointly in the sum of

Eight Million Nine Hundred Seventy Thousand and no cents DOLLARS ($ 8,970,000.00),

payable in lawful money of the United States, and to this bond do obligate their heirs, successors and assigns. In the case of cosureties, the cosureties assume an obligation in the sum of

_____ DOLLARS ($_____),

for_____ and

_____ DOLLARS ($_____),

for_____

The consideration of this bond is such, that if the Principal shall perform this contract, made and entered into on the

31st day of January, 20 11,

to construct State Project No. 578-36-0017 (323) entitled JULIA STREET CRUISE TERMINAL: TERMINAL IMPROVEMENTS located in Orleans Parish

Demolition of Existing Interior and Remodel as well as Addition of New Bridge/Walkway for Entrance & Exit out of Cruise Ships

_____, consisting of _____

according to the stipulations in said contract attached hereto and made a part hereof, pay all sums due on materials and supplies used and for wages earned by workmen employed on the work; this obligation shall be void; otherwise to remain in effect.

It is agreed by the parties that this bond is given in accordance with Louisiana Revised Statutes of 1950, Title 38, Chapter 10.

In faith whereof, we have subscribed this obligation at Metairie, Louisiana

Witness our hands and seals, this 31st day of January, 20 11,

Witness

(Seal)

(Seal)

(Seal)

Ryan Gootee General Contractors, LLC
Principal

By

RYAN GOOTEE
Type or Printed Name

Hartford Fire Insurance Company
First Surety

By

Attorney-in-Fact

Kathleen L. Berni
Type or Printed Name

Second Surety

By

Attorney-in-Fact

Type or Printed Name

ATTESTATION CLAUSE REQUIRED BY
LA. R.S. 38:2227 (PAST CRIMINAL CONVICTIONS OF BIDDERS)

Appearer, as a Bidder on the above-entitled Public Works Project, does hereby attest that:

A. No sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or has entered a plea of guilty or nolo contendere to, any of the following state crimes or equivalent federal crimes:

(a) Public bribery (R.S. 14:118)
(b) Corrupt influencing (R.S. 14:120)
(c) Extortion (R.S. 14:66)
(d) Money laundering (R.S. 14:23)

B. Within the past five years from the project bid date, no sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or has entered a plea of guilty or nolo contendere to any of the following state crimes or equivalent federal crimes, during the solicitation or execution of a contract or bid awarded pursuant to the provisions of Chapter 10 of Title 38 of the Louisiana Revised Statutes:

(a) Theft (R.S. 14:67)
(b) Identity Theft (R.S. 14:67.20)
(c) Theft of a business record (R.S.14:67.20)
(d) False accounting (R.S. 14:70)
(e) Issuing worthless checks (R.S. 14:71)
(f) Bank fraud (R.S. 14:71.1)
(g) Forgery (R.S. 14:72)
(h) Contractors; misapplication of payments (R.S. 14:202)
(i) Malfeasance in office (R.S. 14:134)

Ryan Gootee General Contractors, LLC	Ryan Gootee
Name of Bidder	Name of Authorized Signatory of Bidder
January 19, 2011	President/CEO
Date	Title of Authorized Signatory of Bidder

Signature of Authorized Signatory Bidder

AFFIDAVIT OF NOTICE OF FEE DISPOSITION

PURSUANT TO LA. R.S. 38:2196.1, any person or other entity that enters into any contract awarded without bidding with a state entity or local entity, or any contract with a local entity exceeding ten thousand dollars awarded with bidding, in which a commission, fee, or other consideration is paid to the contractor for the contractor to sell to or provide to the state entity or local entity any commodity, goods, brokerage service or other service of any kind, insurance, or anything of value, then the full disposition, splitting, or sharing of such commission, fee, or other consideration **shall be disclosed to the state entity or local entity by the contractor in writing** by an ***AFFIDAVIT OF NOTICE OF FEE DISPOSITION.***

☐ **ORIGINAL FEE DISPOSITION** (DATE CONTRACT ENTERED: ____/____/____)

☐ **AMENDMENT** (DATE FEE DISPOSITION AMENDED: ____/____/____)

NAME OF CONTRACTOR: RYAN GLOVER GENERAL CONTRACTORS, LLC

NAME OF AUTHORIZED AGENT (PRINT): N/A

MAILING ADDRESS: P.O. BOX 56253, METAIRIE, LA 70055-6253

NAME OF STATE OR LOCAL ENTITY PORT OF NEW ORLEANS

☐ STATE CONTRACT WITHOUT BIDDING

☐ LOCAL CONTRACT WITHOUT BIDDING

☒ LOCAL CONTRACT WITH BIDDING (EXCEEDING $10,000)

VALUE OF COMMISSION, FEE, OR OTHER CONSIDERATION TO THE CONTRACT: $ N/A

PARTIES TO RECEIVE DISPOSITIONS, SPLITS, OR SHARES OF THE COMMISSION, FEE, OR OTHER CONSIDERATION

☐ **SCHEDULE A COMPLETED AND ATTACHED**

CERTIFICATE OF ACCURACY

I hereby certify that the information contained herein is true and correct to the best of my knowledge, information, and belief; and that this Notice shall be attached to and made a part of the contract for which the commission, fee, or other consideration is paid and shall be recorded in the public record.

Signature (Authorized Agent)

SWORN TO AND SUBSCRIBED BEFORE ME

THIS 1st **DAY OF** February, **20** 11

Signature (Notary Public)

Timothy A. Porteous
Notary Public
State of Louisiana
My Commission is Issued for Life.
Bar No. 27040

Created July 2010

www.state.la.us

NON COLLUSION DECLARATION

A sworn statement shall be submitted in the form of an affidavit as indicated below, executed and sworn to by the bidder before persons authorized by laws of the State to administer oaths. The original of such sworn statement shall be submitted by the successful bidder after the Award of Contract.

Affidavit

State Project Number: 578-36-0017(323) (if applicable)

Name of Project: Julia Street Cruise Terminal, Terminal Improvements

Parish: Orleans

Ryan Gootee General Contractors, LLC (an individual) (a partnership) (a corporation)

certify that:

(1) That affiant employed no person, corporation, firm, association, or other organization, either directly or indirectly, to secure the public contract under which he received payment, other than persons regularly employed by the affiant whose services in connection with the construction, alteration or demolition of the public building or project or in securing the public contract were in the regular course of their duties for affiant, and

(2) That no part of the contract price received by affiant was paid or will be paid to any person, corporation, firm, association, or other organization for soliciting the contract, other than the payment of their normal compensation to persons regularly employed by the affiant whose services in connection with the construction, alteration or demolition of the public building or project were in the regular course of their duties for affiant.

(an individual) (a partnership) (a corporation)

WITNESSES:

Elaine L. Gootee

Judy Barbier

Signed _____

By Ryan Gootee

Title President/CEO

Parish or county Orleans

State of Louisiana

Subscribed and sworn to before me this 20 day of January, 2011.

NOTARY PUBLIC (signature)

Thomas McEachin

NOTARY PUBLIC (printed name)

60549 NOTARY PUBLIC NUMBER

for life EXPIRATION DATE